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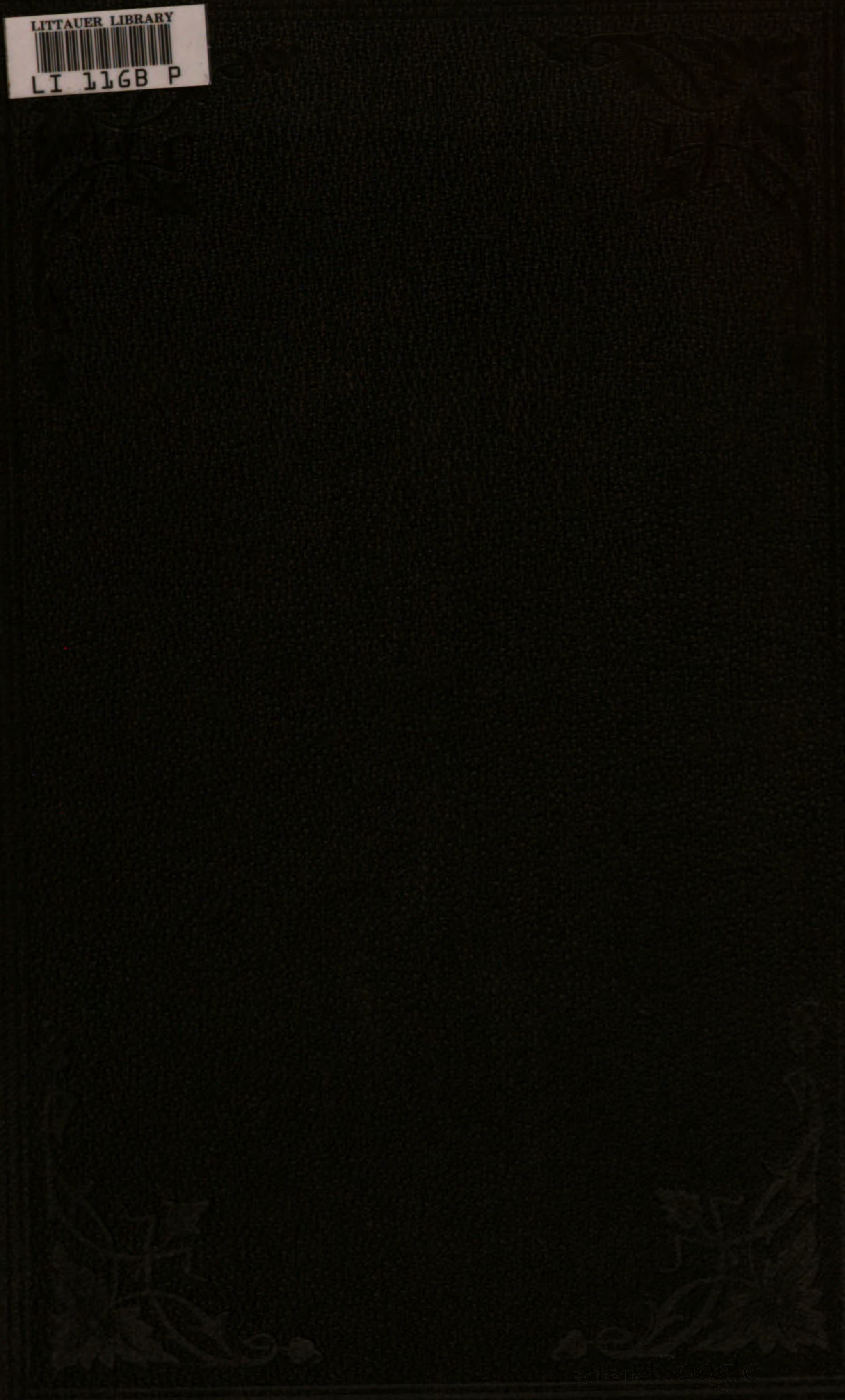

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Forty-Fourth Annual Report

OF THE

Department of Public Works

FOR THE YEAR ENDING
DECEMBER 31, 1919

TO THE
HONORABLE, THE MAYOR AND CITY COUNCIL
OF THE CITY OF CHICAGO

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THE CITY COUNCIL

WILLIAM HALE THOMPSON, Mayor
JAMES T. IGOE, City Clerk

ALDERMEN 1919-1920

1st Ward—
John J. Coughlin
Michael Kenna

2nd Ward—
Robert R. Jackson
Louis B. Anderson

3rd Ward—
U. S. Schwartz
John H. Passmore

4th Ward—
John A. Richert
Timothy A. Hogan

5th Ward—
Robert J. Mulcahy
Jos. B. McDonough

6th Ward—
Chas. S. Eaton
Alex. A. McCormick

7th Ward—
Guy Guernsey
Wm. R. Fetzer

8th Ward—
Martin S. Furman
Ross A. Woodhull

9th Ward—
Sheldon W. Govier
Guy Madderom

10th Ward—
James McNichols
Frank Klaus

11th Ward—
Herman Krumdick
E. F. Cullerton

12th Ward—
Joseph I. Novak
Anton J. Cermak

13th Ward—
John G. Horne
Samuel O. Shaffer

14th Ward—
Joseph H. Smith
Geo. M. Maypole

15th Ward—
Oscar H. Olsen
Edward J. Kaindl

16th Ward—
John A. Piotrowski
Stanley H. Kunz

17th Ward—
S. S. Walkowiak
Stanley Adamkiewicz

18th Ward—
Maurice F. Kavanaugh
John J. Touhy

19th Ward—
James B. Bowler
John Powers

20th Ward—
Matt. Franz
Henry L. Fick

21st Ward—
Earl J. Walker
Dorsey Crowe

22nd Ward—
John H. Bauler
Math. Hibbeler

23rd Ward—
Walter P. Steffen
Thos. O. Wallace

24th Ward—
John Haderlein
James Dorney

25th Ward—
Frank J. Link
Henry D. Capitain

26th Ward—
George Pretzel
William F. Lipps

27th Ward—
Oliver L. Watson
Edward R. Armitage

28th Ward—
Max Adamowski
Clayton F. Smith

29th Ward—
Thomas F. Byrne
James F. Kovarik

30th Ward—
Wm. R. O'Toole
John Burns

31st Ward—
Terence F. Moran
Scott M. Hogan

32nd Ward—
John H. Lyle
Albert J. Fisher

33rd Ward—
Albert O. Anderson
John P. Garner

34th Ward—
John Toman
Jos. O. Kostner

35th Ward—
Thos. J. Lynch
John S. Clark

PAST COMMISSIONERS OF PUBLIC WORKS

WATER BOARD

1851-54—John B. Turner, Prest., Horatio G. Loomis, Alson S. Sherman.
1854-56—James H. Woodworth, Prest., John C. Haines, George W. Dole.
1856-58—Geo. W. Dole, Prest., Orrington Lunt, John C. Haines.
1858-60—Geo. W. Dole, Prest., Orrington Lunt, Noah Sturtevant.
1860-61—Orrington Lunt, Prest., Edward Hamilton, Benjamin Carpenter.

SEWAGE BOARD

1855-59—Wm. B. Ogden, Prest., James D. Webster, Sylvester Lind.
1859-61—James D. Webster, Prest., Sylvester Lind, Philip Conley.

Water and Sewerage Boards merged May 6, 1861, into

BOARD OF PUBLIC WORKS

1861-63—Benjamin Carpenter, Prest., John G. Gindele, Frederick Letz.
1863-65—Francis C. Sherman, Mayor, ex-officio member of the Board.
1863-67—John G. Gindele, Prest., Frederick Letz, Orrin J. Rose.
1865-69—Wm. Gooding and Roswell B. Mason, members of the Board in matters pertaining to the cleansing of the river.
1867-69—Aug. H. Burley, Prest., Wm. H. Carter, John McArthur.
1869-71—John McArthur, Prest., Wm. H. Carter, Redmond Prindiville.
1869-71—Wm. Gooding and Edward B. Talcott, members of the Board in matters pertaining to the cleansing of the river.
1871-73—Wm. H. Carter, Prest., Jas. K. Thompson. Redmond Prindiville.
1873-76—Redmond Prindiville, Prest., Louis Wahl, Jas. K. Thompson.

Board of Public Works abolished September 18, 1876, and on the same date there was established by the City Council

THE DEPARTMENT OF PUBLIC WORKS

1876-78—Monroe Heath, Mayor, Acting Commissioner.
January 7 to May 18, 1879—E. S. Chesbrough.
May 19, 1879, to October 18, 1881—Charles S. Waller.
October 19, 1881, to February 4, 1882—Carter H. Harrison, Mayor, Acting Commissioner.
February 4, 1882, to January 31, 1886—Dewitt C. Cregier.
February 1, 1886, to June 28, 1886—Carter H. Harrison, Mayor, Acting Commissioner.
June 28, 1886, to April 11, 1887—W. H. Purdy.
April 12, 1887, to April 15, 1889—George B. Swift.

April 16, 1889, to April 27, 1891—W. H. Purdy.
April 28, 1891, to December 24, 1892—J. Frank Aldrich.
December 24, 1892, to April 25, 1893—E. Louis Kuhns, Acting Commissioner.
April 25, 1893, to November 21, 1894—Hiram J. Jones.
November 21, 1894, to November 28, 1894—John A. Moody, Acting Commissioner.
November 28, 1894, to April 8, 1895—John McCarthy.
April 8, 1895, to July 20, 1896—William D. Kent.
July 20, 1896, to April 15, 1897—Joseph Downey.
April 16, 1897, to May 21, 1901—L. E. McGann.
May 21, 1901, to May 24, 1905—F. W. Blocki.
May 24, 1905, to March 1, 1906—Jos. M. Patterson.
March 1, 1906, to April 15, 1907—Wm. L. O'Connell.
April 16, 1907, to May 9, 1910—John J. Hanberg.
May 9, 1910, to April 17, 1911—B. J. Mullaney.
April 18, 1911, to April 26, 1915—L. E. McGann.
April 26, 1915, to December 21, 1916—W. R. Moorhouse.
December 21, 1916, to November 4, 1918—Frank I. Bennett.
November 5, 1918, to December 31, 1919—Chas. R. Francis.

DEPARTMENT of PUBLIC WORKS

CITY OF CHICAGO

CHAS. R. FRANCIS
Commissioner of Public Works

WILLIAM BURKHARDT
Deputy Commissioner of Public Works

JOHN A. KLEINE
Chief Clerk, Department of Public Works

CHARLES W. HIBBARD
Head Accountant

FRANK MURPHY
Contract Clerk

Bureau of Engineering	JOHN ERICSON, City Engineer January 1 to July 31, 1919 P. S. COMBS, Acting City Engineer August 1 to October 1, 1919 P. S. COMBS, City Engineer October 2 to December 31, 1919
Bureau of Water	W. J. McCOURT, Superintendent
Bureau of Rivers and Harbors	JAMES J. McCOMB, Harbor Master
Bureau of Streets	FELIX S. MITCHELL, Superintendent January 1 to November 11, 1919 P. Q. ROHM, Acting Superintendent November 12 to November 23, 1919 THOS. H. BYRNE, Superintendent November 24 to December 31, 1919
Bureau of Waste Disposal	LAWRENCE F. KING, General Foreman in Chage
Underground Service Systems	JOHN E. CLEARY, Sec. and Engineer
Municipal Pier	HUGO KRAUSE, Superintendent
Bureau of Parks, Playgrounds and Bathing Beaches	WALTER WRIGHT, Secretary
Bureau of Sewers	GEO. E. McGRATH, Superintendent
Bureau of Maps and Plats	JOHN D. RILEY, Superintendent
Bureau of Compensation	H. V. McGURREN, Superintendent
Bureau of Architecture and City Hall	C. W. KALLAL, City Architect

COMMISSIONER'S REPORT

OFFICE OF
The COMMISSIONER of PUBLIC WORKS, City Hall

March 1, 1920.

The Honorable, the Mayor and City Council.

Gentlemen:

As required by ordinance, I have the honor to submit herewith the Forty-fourth Annual Report of the Department of Public Works, for the fiscal year ending December 31, 1919.

DEPARTMENT EXPENDITURES.

The total expenditures from authorized appropriations of the Department of Public Works for the year 1919 aggregated the sum of $17,388,084.90, accounted for as follows:

	Ordinary	Extraordinary	Total
Corporate fund	$8,032,651.86	$ 938,110.31	$8,970,762.17
Bridge bond fund......		1,273,364.19	1,273,364.19
Water fund	5,430,035.84	1,713,922,70	7,143,958.54
	$13,462,687.70	$3,925,397.20	$17,388,084.90

In addition to the total expenditures above indicated, expenditures aggregating $850,393.93 were certified during the year 1919 on construction contracts executed by the Department of Public Works for work done chargeable to authorized appropriations of other departments, as follows: Department of Health, $157,898.19; Department of Fire, $22,176.50; Department of Police, $16,155.06; Department of Gas and Electricity, $15,187.00; Cook County School for Boys, $27,739.09.

CONTRACTS.

One hundred eighty-four contracts, aggregating the estimated sum of $3,650,923.01, were entered into during the year 1919, summarized as follows:

117 Contracts for Supplies..............................	$2,040,399.20
41 Contracts for Work..............................	1,491,908.55
26 Contracts for Equipment..........................	118,615.26
184 Contracts, totaling................................	$3,650,923.01

These contracts were distributed as follows:

HEALTH DEPARTMENT.

8 Contracts for Work..................................	$13,719.00
5 Contracts for Equipment..............................	7,121.75
	$20,840.75

POLICE DEPARTMENT.

1 Contract for Work	$ 484.00
2 Contracts for Equipment	3,244.43
	$3,728.43

FIRE DEPARTMENT.

1 Contract for Equipment	$850.00

DEPARTMENT OF GAS AND ELECTRICITY.

6 Contracts for Work	$33,878.00

DEPARTMENT OF PUBLIC WORKS.

117 Contracts for Supplies	$2,040,399.20
31 Contracts for Work	1,443,827.55
18 Contracts for Equipment	107,399.08
	$3,591,625.83

WATER SYSTEM.

The following comparative statement of ordinary revenue and ordinary expense of the water works system shows an excess of ordinary revenue over ordinary expense for the year 1919 of $3,153,491.89:

Comparative Statement of Ordinary Revenue and Ordinary Expense of Water System for 1918 and 1919.

Ordinary Revenue.	1918	1919
Assessed rates collections	$3,425,869.64	$3,428,962.93
Metered rates collections	3,926,067.57	4,303,025.01
Miscellaneous revenue	273,204.93	275,863.80
Total	$7,625,142.14	$8,007,851.74
Ordinary Expense.		
Operation of Water Works	$3,260,038.00	$3,201,399.38
Repairs and Renewals	1,336,271.26	1,642,734.26
Interest on Certificates and Judgments	25,631.89	10,226.21
Total	$4,621,941.15	$4,854,359.85
Excess of Ordinary Revenue over Ordinary Expense	$3,003,200.99	$3,153,491.89

NOTE: This item includes expense amounting to $702,291.30 for the year 1918, and $748,475.60 for the year 1919, for services of City departments, as authorized by appropriations made by the City Council.

The expenditures for additions, extensions and betterments of the water works system during the year 1918 aggregated the sum of $2,173,344.92, and for the year 1919 the sum of $1,713,922.70, making a total expenditure for the two years of $3,887,267.62.

WATER WORKS.

The quantity of water pumped amounted to an average of 714,451,000 gallons per day, or 267 gallons per capita, as compared to 251 gallons per capita in 1918.

Bills amounting to $2,632,435.00 were rendered by the Construction Division for work done during the year.

The principal work done by the Construction Division during 1919 consisted of the following:

The building of all of the caissons, except a few at Clark street, for the new Roosevelt Road Viaduct, at a cost of about $400,000.00;

Commencement of the construction of the Western Avenue Tunnel, which will supply the William Hale Thompson Pumping Station, and which will be 6¼ miles long and twelve feet in diameter, and will cost about $4,500,000.00;

The construction of a landing platform for the Wilson Avenue Crib;

The installation, on short notice and at great speed, of a new 650 h. p. boiler in the Lake View Pumping Station, at a cost of about $80,000.00;

The construction of pump pit, in running sand, at the Chicago Avenue Pumping Station.

Water Meters: 2,603 new water meters were installed, and 284 permanent removals made. The total number of meters in service December 31, 1919, was 27,532. The net cost of maintenance amounted to $3.42 per meter.

Assessment and Collection of Water Rates: The gross collections of the Bureau of Water during the year 1919, including special deposits, amounted to $7,915,008.62, an increase of $417,561.39 over the year 1918.

218,647 inspections and reports were made by field assessors, and 265,613 meter readings and reports were made by rate takers during the year.

The American Express Company and the Adams Express Company, under the control of the American Railway Express Company, collected 202,181 water bills, aggregating the sum of $1,057,677.92, an increase of $14,896.90 over the amount collected in 1918.

BRIDGES AND VIADUCTS.

Fifty movable and twenty-six fixed bridges are owned and maintained by the city, and forty-eight viaducts, owned by various railroad companies, are inspected by the department.

Monroe street bridge, under construction by the Union Station Company under the direction of the Department of Public Works, was completed early in the year. This bridge, with its east approach, cost approximately $520,000. It is a trunnion bascule bridge, with a span of 165 feet, providing a roadway thirty-six feet wide, carrying street cars, with two sidewalks ten feet wide each.

Lawrence avenue bridge was completed in 1919. This is a fixed bridge sixty-five feet wide, providing a roadway thirty-eight feet in width, with two sidewalks each about thirteen feet wide.

Work was started on fixed bridges at Kimball avenue, Addison street and Lawndale avenue. Construction was delayed about two months on account of labor difficulties.

Work on bridges at Franklin-Orleans street and Wells street was in progress during the year, although difficulties with labor and material retarded the work greatly.

RIVERS AND HARBORS.

The registered tonnage of vessels entering and leaving the port amounted to 12,298,717, which was 1,328,154 tons less than in 1918.

Dredging inspectors supervised the dumping of 920 scow loads, or 502,235 cubic yards, of material into the lake during the year.

The operation of bridges, which is under the jurisdiction of this bureau, necessitated the employment of 252 bridge tenders.

STREETS.

Garbage and Miscellaneous Wastes: 81,427 tons of pure garbage were collected by the Bureau of Streets and delivered to the Municipal Reduction Plant, at 39th and Iron streets, by boat from the loading stations at Chicago avenue and Oakley avenue, and by direct haul by teams, as well as 1,558 tons of pure garbage collected and delivered by private scavengers, of which last amount 786 tons were delivered to the loading stations and transported from there to the Municipal Reduction Plant by boat. The collection and delivery of garbage cost the city $459,778.08 for the year, or $5.64 per ton ($.172 per capita).

Refuse Collected: 1,628,562 cubic yards, or 353,219 loads of ashes and refuse were collected and hauled to city dumps at a total cost of $1,525,390.02, or $.93 per cubic yard ($.52 per capita).

Street Cleaning: 2,667,411,502 square yards of streets were cleaned by hand (block and gang system), necessitating the removal of 364,157 cubic yards, or 95,421 loads of street dirt, at a cost of $1,346,287.13, or $.504 per 1,000 square yards ($.50 per capita).

Flushing: 3,485,184 square yards of streets were cleaned by horse-drawn flushers in the first ward, at a cost of $796.00. This necessitated the use of 1,739,500 gallons of water.

Cleaned by Auto Flushers: 151,188,021 square yards of streets were cleaned by auto flushers, at a cost of $19,901.00, necessitating the use of 47,287,950 gallons of water.

Alleys Cleaned: 86,536,674 square yards of alleys were cleaned, at a cost of $49,322.86.

Snow Removal: 70,078 cubic yards, or 14,017 loads of snow were removed from 13,588,196 square yards of streets in the first ward downtown district, at a cost of $54,092.26, or $.77 per cubic yard. Also 51,588 cubic yards, or 9,402 loads of snow were removed from 7,943,892 square yards of main thoroughfares in other parts of the city, at a cost of $34,350.23, or $.66 per cubic yard.

Weeds were cut from 4,003,641 square yards of ground in various parts of the city, at a cost of $4,701.29.

Ditches Opened: 47,700 feet of ditches were opened and cleaned, at a cost of $570.00.

The sum of $12,413.48 was spent for emergency repairs on unimproved streets in various parts of the city, including sidewalks, sidewalk intersections, etc.

29,370 permits for street openings, use of streets, etc., were issued during the year, as well as 158 permits for the moving of houses. Work done under these permits is inspected by city forces.

Street Repairs: The sum of $1,063,621.71 was expended by the Bureau of Streets from the Vehicle Tax Fund for repair and maintenance of streets.

The yardage of street repairs on various classes of pavement was as follows: Asphalt, 151,029; brick, 43,130; creosoted block, 9,865; granite block, 54,268; macadam, 345,246.

In addition to this street repair work 7,027,000 square yards of street pavement were oiled, and 35,460 square yards of streets were resurfaced with asphaltic concrete.

MUNICIPAL REDUCTION PLANT.

The total amount of raw garbage received at the Municipal Reduction Plant aggregated 82,816 tons, with the resultant production of 3,393,360 pounds of garbage grease and 14,623.89 tons of garbage tankage. The revenue from the sale of products aggregated the sum of $321,586.15. The expense of operation of the plant amounted to $548,687.54.

SUBSTRUCTURE SURVEYS.

The work of platting the locations of utility sub-structures and other underground obstructions has been continued. Records of sixty acres of the downtown district are now complete, comprising the location and platting of 130 lineal miles of sub-structures, such as gas mains, water mains, telephone conduits, electric conduits, telegraph conduits, etc.

PARKS, PLAYGROUNDS AND BATHING BEACHES.

Sixty-eight small parks and seventy-two playgrounds were operated to provide the maximum recreation and enjoyment for both children and adults during the year. Three new playgrounds were established in school yards at the Cooper, Resin Orr and Whittier Schools.

The bathing beaches and swimming pools were patronized to a greater extent than ever before. The attendance at the four bathing beaches was 692,377, the natatoriums 429,694 and the protected street ends 621,149, a total of 1,743,220.

William Hale Thompson playground, immediately north of Clarendon Beach, was completed during the year, and immediately became very popular.

The shore protection at 76th Street Beach was completed and has not only stopped the erosion, but has added considerable beach property to the frontage between 76th and 78th streets.

A new bathing beach was established in Rogers Park during the summer by the taking over of and refitting the old Rogers Park Pumping Station at the foot of Kenilworth avenue.

MUNICIPAL MARKET.

The city received $4,037.50 in revenue from rent of stalls, and expended $4,951.16 for operation of the market, leaving a loss of $913.66 for the year.

SEWERS.

$466,614.99 was expended by the Bureau of Sewers during the year 1919, of which $247,695.97 was for cleaning, and $107,554.39 for repairs.

6,198,500 lineal feet of sewers were cleaned by flushing, at a cost of $39,495.96, or $.64 per 100 feet.

556,300 lineal feet of sewers were cleaned by scraping, at a cost of $60,566.24, or $10.89 per 100 feet.

11,719 catch basins were cleaned by hand, at a cost of $40,435.02, or $3.45 per catch basin.

32,461 catch basins were cleaned by the Auto Eductors, at a cost of $63,683.37, or $1.96 per catch basin.

There are now seven Auto Eductors in use—one for each sewer cleaning district. Cleaning by hand cost $3.45 per catch basin, while cleaning by the machine cost only $1.96 per catch basin.

MAPS AND PLATS.

The area of Chicago is 199.372 square miles.

The work of surveying railroad property was continued, $22,177.85 having been expended on this work during the year. When the various surveys are completed it is estimated that the city will be able to reclaim considerable property or obtain its value from the railroads.

COMPENSATION.

The annual revenue for the year 1919 was $396,614.34. 3,118 permits were issued during the year, 1,970 of which were for merchandising stands, 769 for automatic weighing machines and the balance miscellaneous permits of various kinds.

MUNICIPAL PIER.

It is estimated that over four million persons visited the pier during the year. Concerts, entertainments by the Drama League, patriotic meetings, etc., were held in the Auditorium.

The revenue derived amounted to $186,607.10, from which $6,061.05 was refunded. $26,975.26 was derived from refreshment and dancing concessions, $6,060.82 from docking permits and $145,092.13 as rental for space.

ARCHITECTURE.

The Bureau of Architecture prepared plans and specifications and supervised the work of construction on sixteen projects, on which twenty-four contracts were awarded, amounting to the sum of $79,999.32.

In addition to this, plans and specifications were prepared for work amounting to approximately $283,772.72. Contracts for this work will be let in the near future.

Included in the foregoing are the following: Addition to Chicago Avenue Pumping Station, including pump room and transformer room, and stone fence, with shelter, estimated at $150,000; equipment for Ward Building No. 2 of the Contagious Disease Hospital, amounting to $63,772.72; Fire Engine House, with handball court, at 744 West 35th street, estimated at $70,000.00; Southwest Electrical Substation, at 10227 South Halsted street, estimated at $30,000.00.

$15,000.00 was expended during the year in painting elevator shafts and various offices in the City Hall.

Labor troubles and difficulty in obtaining materials, as well as excessive costs, hampered the work of the department greatly, and caused the postponement of a considerable amount of work.

The reports of the various bureaus of the department present the work for the year in detail.

Yours very respectfully,

CHAS. R. FRANCIS,
Commissioner of Public Works.

BUREAU OF ENGINEERING

HON. CHARLES R. FRANCIS,
Commissioner of Public Works.

Dear Sir:—

Herewith I submit the annual report of the operation of the Bureau of Engineering, Department of Public Works, for the year ending December 31, 1919.

In accordance with the customary procedure, I wish to present, preceding the divisional reports, a summarized statement of our activities as the City Engineer's personal report.

In order to do this intelligently, I am calling attention to the points of interest and importance as taken from the divisional reports, and in addition certain activities carried out through the medium of the City Engineer's general office force.

GENERAL ACTIVITIES.

The year 1919 being one in which both the labor and material markets were in a very unsettled condition, many activities that should have been carried out and completed were necessarily curtailed or abandoned for more propitious times. In addition, the fact is to be borne in mind that both the Corporate and the Water Funds are at the present time inadequate, since they are practically based upon conditions and requirements that applied to the city of Chicago as of several years ago.

INVESTIGATIONS AND REPORTS.

The most important investigation made during the year 1919 under my personal direction was the preparation of the comprehensive plan for the improvement and reconstruction of the city water works of Chicago. This report is made a part of the annual report of this Bureau, and is hereto attached. It is my opinion that the data contained therein and the plan outlined should be followed as closely as possible in all future developments of the city's water works, since they represent the study and expert opinion of all branches of the Bureau of Engineering, properly co-ordinated so as to form a comprehensive whole. No further discussion will be made here on this plan since it is entirely complete in itself.

CHANGES IN ORGANIZATION IN THE BUREAU.

During 1919 I re-organized the Bureau so that all the work of the various divisions would be properly co-ordinated with each other, and I have endeavored to eliminate all over-lapping of functions. Incidentally, it was found necessary to establish the position of Engineer of Contracts, which has paid for itself many times over through the medium of securing a wider field of competition for bids, better prices, and more business-like methods of doing business with outside concerns. In fact, it is estimated that the establishment of this position made it possible for us to save ninety-eight thousand dollars, and we would have been able to have saved more on other items had this position been established earlier.

REPORTS BY DIVISIONS.

Construction Division.

The report of the Construction Division is hereto attached. It will be noted that the items of greatest interest are as follows:

1st—The construction of all caissons for the new Roosevelt Road Viaduct, which work was finally made possible to start on because of the fact that through your efforts and the work of the writer we finally overcame all objections of outside parties concerned in the Roosevelt Road Bridge which had been made for a number of years because of the time required to get all parties concerned together upon a common footing and iron out the conflicting causes of delay. This bridge is, without question, one of the most difficult engineering feats attempted, i. e., the construction of such a wide viaduct made of reinforced concrete cantilever beam construction, with the necessity of maintaining traffic in all directions, both vehicular, foot passenger, street cars, and all railroads underneath same, and, since there are forty-six tracks under this structure, upon which switching is continually going on, and through passenger and freight trains traveling thereon, the enginering magnitude of this work becomes readily apparent.

2nd—Active work was started in the construction of the Western Avenue Tunnel, which is to supply the new William Hale Thompson Pumping Station, which will be the largest pumping station in the world so far as capacity is concerned. Ground was broken for the starting of this tunnel on November 7, 1919, by Mayor William Hale Thompson, at 73rd and Wood Streets. Further details of this work will be found in the report of the Construction Division.

3rd—The successful construction of the monolithic landing platform at the Wilson Avenue Crib, which work was carried on under very adverse conditions, is a recognized feat of engineering.

4th—The installation of the new 650 H. P. boiler at Lake View Pumping Station was made in record time, and the plans completed for the removal of the balance of the old boilers and the installation of the new boilers at this station, which work will bring this station into A-1 condition.

5th—The revising of the plans for the additional electric units for the Chicago Avenue Pumping Station, whereby, instead of removing the old Holly pumps, an addition has been built to this station with a very large pump pit which was built in running sand fifteen feet below the ground water line and directly connected with the old buildings, will make possible the installation of two additional units in 1920 in the old Holly room, which will greatly increase the capacity of this station.

6th—The start of the work of electrification of the 68th Street Pumping Station was very well advanced toward the latter part of the year.

The work of the Construction Division during the year 1919 amounted to $2,632,435.50.

Water Pipe Extension Division.

Owing to the curtailment of building and paving activities, the extensions made in the distributing system were not as great as in some previous years, although showing an increase over 1918. 48.14 miles of mains were laid; 815 new hydrants established, and 519 new valves installed. Repair and maintenance work on the system was carried on with a reduced force.

Operating Division.

The one thing that I can say of interest in regard to the Operating Division is that all operating engineers of the city service employed at the major pumping stations of the city are to be thoroughly complimented on the fact that they have been able to continue supplying as much of the public demand for water as they have, considering the condition which so much of the equipment at the various pumping stations is in at the present time due to lack of funds to provide for proper rehabilitation, for the elimination of necessity of overloading units, and for reserve units.

Marshall Boulevard Municipal Plant.

Due to the conditions under which this plant has been operated in the past, a serious state of affairs faced the writer when he took charge of this Bureau, it being a question, practically, whether we should shut down the shops and consider the attempt to operate a centralized shop as a failure, or to re-organize the shops so as to put them on a self-sustaining business-like basis.

The writer conducted an investigation of conditions existing and came to the conclusion that the shops could be made self-sustaining, and with this as a start he has endeavored to re-organize the shops so that they will operate efficiently and in a business-like manner.

One of the first steps taken in the re-organization of the shops was the placing of a competent executive in complete charge of the shops, warehouse and garage, who made a careful study of the plant as suggested, and has executed the same with many valuable suggestions and additions, and today we believe we will have one of the most complete municipal shops in the world, providing all recommended improvements are made.

I also secured the consolidation of the two capital accounts, formerly designated as the "Water Works Suspense Stock Account" and the "Municipal Shops Capital Account" under one capital account designated as the "Municipal Material and Service Capital Account" for the purpose of expediting the accounting and improving the financial condition of both capital accounts.

Furthermore, the new basis of charging off the overhead or burden cost as established in the 1920 appropriation bill will, without question, simplify the former methods of charging for the work done.

Designing Division.

Due to the lack of appropriations for designing preliminary plans for our contemplated extensions, the Designing Division has carried out only the regular routine work of the year, lending valuable assistance, however, in the work of the Comprehensive Plan for Chicago's Improved Water System, and I would recommend that a more liberal appropriation be made for the use of this capital account so as to enable this Bureau to make research studies and investigations and preliminary plans for contemplated improvements and developments in the water system.

Water Meter Shops.

In regard to this division I would call your attention to the fact that the city was unable to install several thousand meters due to the lack of appropriations for meter connections. I would, therefore, urge an additional appropriation for this purpose.

Testing Division.

This division has proven itself highly efficient, rendering valuable service not only to this Bureau and various other bureaus and departments of the city, but also to the Board of Education and other branches of the City Government, and, although their findings have in several cases been contested, after a careful research by the contesting parties they have concurred in the findings of the Testing Division. I consider that their efficient and conscientious work has saved to the city many thousands of dollars during the year.

Bridge Division.

A careful study of this report, which is given in detail, will impress the reader with the magnitude of the city's bridge problems and the unsettled condition of the labor and material markets has added to their many difficulties. This Division under the Engineer of Bridges has well under way a very comprehensive study of the question of replacing the present movable bridges with fixed bridges. The investigation, although it is being carried on without any appropriation for such studies and is not complete, shows to date that the city would save millions of dollars by replacing its movable bridges with fixed bridges because of the change in navigation.

In conclusion I call to your attention the many items of interest in the various reports, that have been planned and started during this year, which I feel sure will greatly improve the operations of this Bureau during 1920 and the coming years.

Yours truly,

P. S. COMBS,
City Engineer.

COMPREHENSIVE PLAN

Chicago Improved Water System 1920-1955 Cost and Building Program

Prepared under the direction of
P. S. COMBS, City Engineer.

Approved by

CHAS. R. FRANCIS, Commissioner of Public Works.	WM. BURKHARDT, Deputy Commissioner of Public Works.

COMPREHENSIVE STUDIES AND PLANS.

It is an accepted fact that a plan is a most necessary part of any undertaking and that a detailed and comprehensive study must precede the plan. The bigger the undertaking, the more important are these two items.

In constructing a bridge, a piece of machinery or a building, the first step is the requirements or duties that it is to perform. These are naturally determined by the analysis of research along lines similar to the undertaking, and upon intelligent forecast as to future requirements of the structure.

If, for instance, a building is to be built to the ultimate height of ten stories, but due to present conditions but five stories are required, it is only economy and good business to build the foundations and the first five stories of this building of sufficient size and strength to carry the other five stories that are to be added later. The constructing of one five-story building, wrecking it, and then erecting a ten-story building in a matter of a few years would be considered an utter folly.

A water system for a city of the size of Chicago is a far greater project than the construction of any building or bridge, and the principal steps or governing factors in its construction are primarily the same as those in any other structural undertaking, but, being many times larger, requires more detailed and minute study of, first, all the requirements and loads that are apt to fall as a demand upon the system, and, second, the units that will best take care of these requirements, the location of the different units as regards economical operation, service to the water consumer, and the investment of dollars and cents, not as an original investment, but as a total, taking into consideration original cost, interest and depreciation and operation.

In an undertaking of the magnitude of the Chicago water system, a complete comprehensive study and plan are absolutely essential, so that at all times those who are entrusted with the building up of this great system may look ahead as far as possible and as accurately as good engineering and careful analysis will permit into the future demands, so that all work may be done with an ultimate object in view.

As time goes on, this plan would be corrected and extended to cover one co-ordinated system for the entire city.

Until very recently, a comprehensive plan of Chicago's future water system was not in existence. Several attempts had been made to make one, but, due to lack of funds to secure the proper data and compile the same, plans were never altogether completed. Those who had this work in hand made the most out of the limited data available, but with incomplete facts were naturally unable to submit a complete and proper plan of the system.

This lack of pre-planning is apparent in many parts of our present water system.

Our tunnels are so laid out that in case of accident to almost any one of the cribs, a very large portion of the city would be without water.

The pumping stations are equipped with only sufficient units to supply their own individual districts. In case of any breakdown in a unit, in most cases the district will suffer. In the case of crippling a complete station, the surrounding stations are not of sufficient capacity to take over its load.

This is true also largely in the underground system.

This method of building without due regard to the future means duplicating work in the near future and a patch-work system with little or no flexibility, each part being solely dependent for its source of supply on one unit of the system in place of all of the system available.

Each step in a comprehensive plan covering any number of years should be audited and checked before the actual work is done, and intelligent changes in minor details will naturally be made. A plan is not accepted as final, but as a guide. Therefore, if it is practical, as each step is completed, the entire system when finished will of necessity meet all requirements.

BASIS OF STUDY.

In the study of Chicago's improved water system, each square mile of the city (there being some 200 in number) was taken as a unit and first considered alone. Data were gathered as to population and water consumption from the year 1890 up to the present date.

A curve was then plotted on these figures which showed the past requirements of each square mile. The curve was then extended up to the year 1940 in order to arrive at the requirements for the future.

The divisional engineers of the Water Pipe Extension Division made a personal survey of each square mile, recording the area devoted to domestic and industrial uses, parks and railroads, and the areas unimproved.

The rate of growth of both the industrial and domestic requirements in each square mile was taken into consideration along with the general trend of improvements to or from the district, and an ultimate conclusion from all of this data was drawn, to arrive at ultimate and intermediate requirements for that area.

From these figures the total requirements of the city were found, and, as far as population was concerned, they agreed very closely with the findings of other organizations and investigations.

Throughout this preliminary work, the unit of 300 gallons per capita of maximum consumption was used, this being slightly under present maximum requirements. The average daily consumption was figured at 240 gallons per capita at the present time, gradually decreasing to 160 gallons per capita in 1940, and maintaining that figure thereafter.

PER CAPITA CONSUMPTION.

There are two branches to this subject:

(First) Maximum per capita consumption. On this figure the system must be built. It is readily understood that there are times in the day in any system when the demand is greatly in excess of the average. This occurs every day. There are also days in the year when the demand is greatly in excess of the average day, such as very warm or very cold days. The system, as far as capacity is concerned, must be built to meet these maximum requirements and to give service when the greatest load period occurs.

(Second) Average daily per capita consumption is naturally much lower, as it is the mean average of all pumpage for the day or the year, as the case may be. This figure has nothing whatsoever to do with the capacity of the system, but is the governing factor on cost of operation.

The maximum load is governed entirely by the characteristics of the city and the climate, and in the case of Chicago it can be changed very little.

The average load is controlled by the use and leakage of water, and can be lowered by stopping leaks both below and above ground and by educating the consumer to use but not abuse the water system.

Don't confuse these two figures.

In case we are successful in lowering the average per capita requirements in Chicago, the effect will be to lower our annual cost of operation. If we are fortunate enough to lower the maximum demand, it will not affect the plan in its total, but simply postpone some of the steps in the building program.

Should any such occasion arise, it will be seen from time to time, and proper corrections made, but in no way can any future saving affect our present requirements.

It must be remembered that to effect such a saving it takes years, and in the meantime the demand is growing, and present requirements must be taken care of.

PUMPING STATION DISTRICTS.

From the data secured, as stated before, a district was laid out for each pumping station to supply. In locating the boundaries for these districts, due consideration was given to the present location of the pumping station, the equipment in the station, the possibilities of enlargement without undue cost, present mains supplied by the station, additional expenditures necessary, economy of operation and upkeep, and service to the consumer.

After these districts were so laid out, it was found a large portion in the southwest part of the city could not now or in the future be supplied from existing pumping stations in an economical manner; nor even by sacrificing cost of operation could adequate service be given in this district.

It was concluded, therefore, to build one new station in the neighborhood of 47th Street and Western Avenue to supply this district at present, and in the future another station in the neighborhood of 73rd Street and Central Park Avenue.

PRESENT AND IMMEDIATE NEEDS.

A survey of the city shows many districts that are without water service at the peak load times, and some with very poor service at all times. This is a condition that has been in existence for some time, and is steadily growing worse.

As an example: During the year 1919 had we given service to the water consumer we would have needed 200 million gallons per day more pumping capacity than we had, counting all reserves.

The work set forth in the following pages to be done in 1920 and 1921 is work that is absolutely essential to relieve this shortage, and to replace elements of the system that have outlived their usefulness, the work being done, however, as a part of the total ultimate plan.

In the first two or three years of this work, there are a few places where economy will have to be sacrificed for the sake of service, but, once the water system is in practical condition, economy and service will go hand in hand.

In order to give service to the consumer on the third floors, it is necessary to maintain a pressure of 25 pounds at the curb. In our present system we find, from a detailed check of the pressures in different districts of the city, that under average conditions there are quite a number of sections that are supplied with this pressure. There are a great many, however, where the pressure is below 20 pounds; some districts are practically always below 15 pounds, and there are still others that are practically always below 10 pounds. These being pressures under average loads, when the maximum load comes, these pressures, of course, all drop anywhere from 3 to 8 pounds, as the case may be, so that in many districts water cannot be obtained above the second floor, and at some time during the day not even on the first floor.

This pressure condition is a subject that every city official has had ample cause to be acquainted with, and its existence cannot be denied.

The following plan will eliminate this condition entirely, and give sufficient service to everybody. The items of rehabilitation set forth in this plan, such as the replacement of minor equipment, building changes, etc., were arrived at by a committee, made up of the heads of all divisions interested in this branch of the work and the chief operating engineers of the pumping stations who went to each station and recorded the time and service and, by personal observation and records, the condition of each piece of machinery in each station, and its probable future life. On the findings and recommendations of this committee all replacements are based.

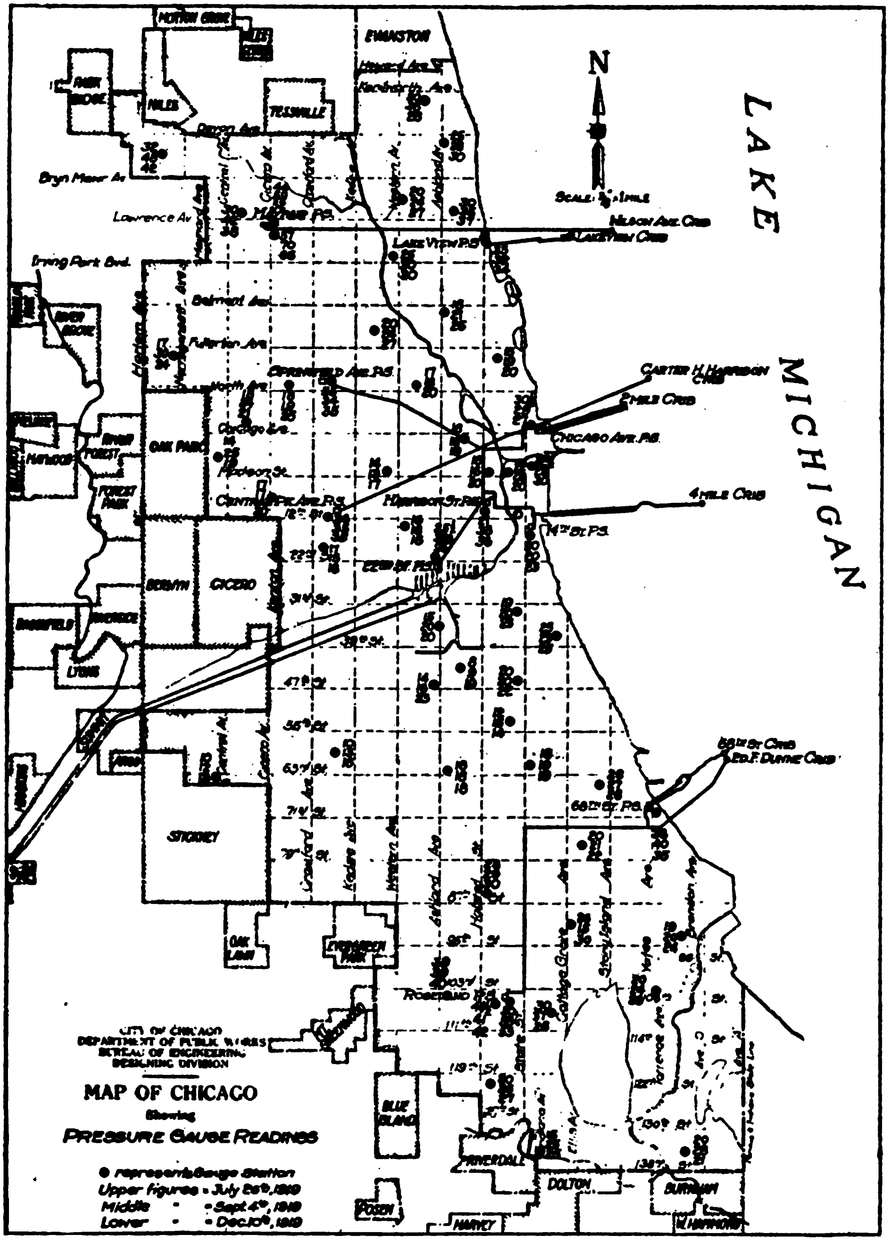
MAYFAIR PUMPING STATION.

This station supplies the district in the extreme northwest part of the city, and is one of the newest stations, being completed in 1918. It is equipped with five vertical triple expansion pumping units, three being of 25 million gallons per day capacity low pressure, and two of 17½ million gallons per day capacity high pressure, making a total of 110 million gallons per day total capacity for the station. There are foundations already installed for two additional pumps.

This station, being thoroughly modern and in good condition, is able to give good service to the territory it supplies.

There is needed in this station, however, during the year 1920 three new boiler feed pumps, new pitometers, coal storage improvements, new chlorine equipment, and funds to complete current work, as set up in the 1920 budget.

Due to the condition of Central Park Avenue and Springfield Avenue Pumping Stations, as will be taken up later, it will be necessary, now and during the construction period at these two stations, to carry temporarily part of their



load through the Mayfair Pumping Station. In order to accomplish this it is intended to install one new 60 million gallon per day turbine driven centrifugal pump at the Mayfair station, and isolate a line from this pump to carry the western part of the districts of Springfield Avenue and Central Park Avenue Pumping Stations. This pump would be in operation until construction at these two stations is completed, and is absolutely essential, as the Wilson Avenue tunnel has an excess of water that can be used, while the full capacity of these two stations is required at all times, and it would be impossible to make any change in them without seriously affecting the service in their district without this outside help.

During the period of 1925 to 1930 the maximum requirements of this district will be in the neighborhood of 142 million gallons per 24 hours. Therefore, it is contemplated in about 1925 to remove this turbine driven centrifugal pump to one of the other stations and to install in its place a 40 million gallon per day vertical triple expansion pump. This would give this station a capacity of 133 million gallons per day plus 17 million gallons per day reserve.

This equipment would then carry the station through until 1940 to 1955, when the maximum requirements of the district would be 170 million gallons per day. At that time another 40 million gallon per day triple expansion pump should be installed, making the capacity of the station 165 million gallons per day plus 25 million gallons reserve.

It is estimated that this program would cost $625,000.00, $200,000.00 of which would be expended in 1920. The station would then be in condition to give service at all times and have sufficient reserve to assist the neighboring districts in case of accident.

Yearly expenditures:

1920	$200,000
1925	175,000
1940	250,000
Total	$625,000

LAKE VIEW PUMPING STATION.

This station supplies the extreme northeast section of the city, and is comparatively new, the last unit being completed in 1915. It is equipped with four vertical triple expansion pumping units of 25 million gallons per day capacity each, making a total of 100 million gallons per day for the station.

Since the completion of the station the five Sederholm type boilers installed have never been given a certificate to operate by the City Boiler Inspector, and have been a source of considerable trouble, recently several of their number being condemned and sealed by the Boiler Inspection Department.

During the year 1919 one Edgemoor Boiler, consigned to Springfield Avenue Pumping Station, was installed in this station. This boiler is now carrying the full load of the station. Request has been made for additional boilers to take the place of the three remaining Sederholm type boilers.

This work is of extreme importance, as, should anything happen to the present Edgemoor boiler, the station would be completely closed down, with an utter impossibility of supplying water to all of this district from the surrounding stations. As it is, it will take considerable time to install the new boilers, and a very serious condition exists in the meantime.

Together with this work, new boiler feed pumps are needed and new chlorine equipment, this work all to be done during the year 1920.

This station is located on the lake shore, and is pumping water in three directions only, which is not an economical plan.

The station is not equipped with a switch track from any railroad. Therefore, all ashes must be hauled from the station by team or truck and all coal hauled in, which means an extra expense on every ton of coal used of over $1.00.

As this district is a growing one and in the future will need considerably more water, and, as it would be impractical to increase the capacity of this station to take care of these growing demands in the face of conditions as mentioned, we can operate this station up to about the year 1934 with its present capacity, at which time the requirements of the district would increase to approximately 126 million gallons per day maximum load.

It is planned, therefore, to build a new station located in the center of the district on the railroad. This station is estimated to cost complete $2,200,000.

Construction would be started in 1931 and completed in 1933. The building would be equipped with two 650 H. P. boilers and two 60 million gallons per day turbine-driven centrifugal pumps.

In 1934, or as soon as this station was in operation, work would be started on removing the boilers and pumping equipment from the present station to the new station.

On the completion of this work the station would have a capacity of 180 million gallons per day plus 60 million gallons per day reserve, the requirements of the district in 1935 to 1940 being 180 million gallons per day maximum load.

In 1940 to 1955 the requirements of the district would increase to approximately 204 million gallons per day, and in 1950 an additional 60 million gallons turbine-driven centrifugal pump would be added, making the capacity of the station 240 million gallons per day plus 60 million gallons reserve.

This complete program is estimated to cost $2,448,000, $248,000 of which would be spent in 1920. The station under this plan would at all times be capable of taking care of the full load in its own district, and have sufficient reserve to assist in case of accident in neighboring districts.

Yearly program of expenditures:

1920	$248,000
1931	500,000
1932	500,000
1933	850,000
1934	250,000
1940	100,000
Total	$2,448,000

SPRINGFIELD AVENUE PUMPING STATION.

This station and its equipment are twenty years old. It is equipped with four vertical triple expansion pumping units that have quite outlived their usefulness, three of them being of 20 million gallons per day capacity and one of 40 million gallons per day. It is further equipped with one turbine-driven centrifugal pump of 25 million gallons capacity, which is very uneconomical in operation.

The three 20 million gallon pumps are built for 120 foot head and the 40 million gallon pump for 110 foot head, while Mayfair Station is equipped with units of a great deal higher head capacity.

This inequality has been the cause of considerable trouble in this station, and necessitates considerable manipulation of the valves in the distributing system in order to keep these units in operation. They are not of sufficient head to supply the district that this station must supply, with good service.

Further, the steam ends of all four of these pumps are in very bad condition, the cylinders being cracked, and due to insufficient strength in some of the working parts continual breakage occurs. The pumps cannot be depended upon either for service or stability. Therefore, immediate complete rehabilitation of this station is essential.

It is planned during the year 1920 to install one new 60 million gallons per day turbine-driven centrifugal pump, complete the work on the boiler plant, install new chlorine equipment and make some necessary repairs to the building.

Work will be started in the dismantling of the present vertical pumping units, and in their place the installation of the three vertical triple expansion pumps from the Chicago Avenue Pumping Station.

During the year 1921 the work of removing these three pumps will be completed, also three new boiler feed pumps will be installed.

Upon the completion of this work the station would have a capacity of 110 million gallons per day plus 50 million gallons per day reserve, counting the present installed centrifugal.

During the construction period the station would operate at about 75 million gallons per day, the balance of the district being taken care of by Mayfair Pumping Station.

In 1923 it is planned to repair the front of the building where it is settled.

In 1930 to 1935 the maximum requirements of this district would be approximately 117 million gallons per day. Therefore, in 1930 one new 60 million gallons per day turbine-driven centrifugal and one new boiler would be installed, making the capacity of the station 135 million gallons per day plus 85 million gallons reserve.

In 1940 to 1955 the maximum requirements of the district would be further increased to approximately 194 million gallons per day.

Therefore, in 1940 one new 50 million gallons per day turbine-driven centrifugal pump would be installed, bringing the total capacity of the station to 195 million gallons per day plus 75 million gallons reserve, considering the present turbine-driven centrifugal as part of the reserve.

All of the work set forth in the above is estimated to cost $694,300, of which $258,000 would be expended in 1920.

By the end of 1921 this station would be in good shape, and at that time and thereafter be of sufficient capacity to take care of the maximum load in this district with sufficient reserve to assist in case of accident in the neighboring districts.

Yearly program of expenditures:

1920	$258,000
1921	156,300
1923	20,000
1930	160,000
1940	100,000
Total	$694,300

CENTRAL PARK AVENUE PUMPING STATION.

The equipment in this station is of the same type and capacity and in the same condition as noted for the Springfield Avenue Pumping Station.

Complete rehabilitation of this station is therefore essential.

During the year 1920 it is planned to install new chlorine equipment, new ash handling equipment, new coal crusher and soot blower, and two new sump pumps, and to make some necessary alterations in the building in order to accommodate new office and store room.

Work would be started during this year on the removal of the four vertical pumping units, and in their place the installation of two 60 million gallon per day centrifugal pumps. This work would be completed during the year 1921, and in that year a new double steam header system installed in the boiler room.

During this construction period the station would operate at about 75 million gallons capacity, the balance of this district being carried by the Mayfair Pumping Station.

Upon the completion of this work the capacity of the station would be 120 million gallons per day plus 25 million gallons per day reserve, and in 1925 to 1930 the requirements of the station will be approximately 121 million gallons per day maximum.

In 1923 three new boiler feed pumps will be required to replace the present pumps, and in 1925 considerable rehabilitation work will be necessary in the outside coal storage equipment.

In 1930 to 1935 the maximum requirements of this district will have increased to approximately 132 million gallons per day. Therefore, in 1930 it is planned to install two new 60 million gallons per day turbine-driven centrifugals and one new boiler.

During the period 1940 to 1955 the maximum requirements of this station will be approximately 170 million gallons per day. The capacity of the station will be 180 million gallons per day plus 85 million gallons reserve, counting the present turbine-driven centrifugal pump.

It is estimated that this work in total would cost $580,900, of which $144,600 would be expended in 1920.

After 1923 when the first step in the rehabilitation program would be completed the station would be in good operating condition, and at that time and thereafter of sufficient capacity to take care of the maximum load in its district with sufficient reserve to assist in case of accident in neighboring districts.

Yearly program of expenditures:

1920	$144,600
1921	158,000
1923	6,300
1925	12,000
1930	260,000
Total	$580,900

CHICAGO AVENUE PUMPING STATION.

This is the first pumping station built in the city, and, though its location is not as desirable as it might be, due to the fact that it is located in the extreme east side of the district that it supplies and that it is without any railroad facilities, it is considered desirable to maintain this station at its present location, as it is a wonderful piece of architecture and a land mark that Chicago is proud of, and the major portion of the demand on this station, being located in the "Loop" district, is comparatively close to the station.

It was found some little time ago that additional capacity was required, and the installation of two new electrical pumping units was started.

Due to the smoke nuisance and the undesirability of a large coal storage in this neighborhood and the expense involved in hauling coal and ashes, it is planned to completely electrify this station, removing, as stated before, the steam units to the Springfield Avenue Pumping Station.

During the year 1920 it is planned to install new chlorine equipment, complete the work now under way on building, and tunnel changes, new pump room and two new pumps, and to install two new 60 million gallons per day motor-driven centrifugals to take the place of the present steam units. This would give the station a capacity in electrical units of 150 million gallons per day plus 60 million gallons reserve. The requirements of this district would be approximately 152 million gallons per day maximum.

In 1921 the above work would be completed, and boilers and balance of steam units removed from the building.

In 1930 to 1935 the requirements of the district around this station would be increased to approximately 207 million gallons maximum. It is therefore planned in 1930 to add one 50 million gallons per day motor-driven centrifugal pump, which would bring the capacity of the station up to 210 million gallons per day plus 50 million gallons reserve.

The total cost of this work is estimated at $555,000, of which $390,000 would be expended in 1920.

After the first construction period is completed the station will have an available capacity to supply all demands made by its district, and sufficient reserve to assist in case of accident to any neighboring districts.

This station will furnish the major portion of water to the "Loop" district.

Yearly program of expenditures:

1920	$390,000
1921	115,000
1930	50,000
Ttoal	$555,000

22nd STREET, 14th STREET AND HARRISON STREET PUMPING STATIONS.

The districts for these three stations will be considered as one district, for the reason that after very careful analysis of conditions and requirements it became evident that the best plan would be to build one station to take the place of the three.

At 14th Street Pumping Station, all pumping units are in comparatively good condition, but the boiler plant is in need of complete rehabilitation. In order to maintain service in the district, the capacity of this station should be increased 100 million gallons per day in the very near future. In order to make this increase, it will be necessary to make considerable building changes, build new stack and foundation for same, change the boiler room and put in a new pump pit, make tunnel changes and add a new wet well. In addition to this, there would be needed new boilers and coal handling equipment and the added pumping equipment. This work would cost approximately $725,000, and still leave the present pumping equipment to be replaced at a later date. Further, the station is without track facilities, and all coal must be hauled in at an added expense.

22nd Street Pumping Station, in order to maintain service in the district, would also require an increase of 50 million gallons capacity per day in the very near future. The discharge system would require complete rebuilding on or before 1925. This work is estimated to cost $150,000, and should the station remain in operation, it would be further necessary to replace all but two of the present pumping units in the near future, as they are not to be depended on with any degree of safety.

Harrison Street Pumping Station has quite outlived its usefulness, is expensive to operate, and is of small capacity, and, as there is no practical possibility of increasing the capacity, it is deemed best to abandon this station in the near future, in any event.

In view of the foregoing facts, it was planned, therefore, to build a new station located in the neighborhood of Halsted Street and the River, which would be the center of demand for this district.

This station would have 240 million gallons capacity per day, with 120 million gallons per day reserve, equipment to be 60 million gallons per day turbine-driven centrifugals. Estimated cost for buildings and equipment $2,550,000 to be expended:

1921	$ 500,000
1922	500,000
1923	1,000,000
1924	550,000

Work would be started on the construction of this plant in 1921 and completed in 1924, at which time the other three stations would be abandoned.

The following statement will show a comparison of cost between the two plans:

Estimate of Cost for New Station.

Buildings	$1,500,000	
Machinery and equipment	1,050,000	
Necessary tunnels and shafts	590,000	
Ground	173,250	
Necessary added feeder mains	1,277,600	
Total		$4,590,850

Against this amount will be charged the following items as a partial offset:

Omission of future improvements necessary at 22nd Street Pumping Station	$150,000	
Omission of future improvements necessary at 14th Street Pumping Station	725,000	
Omission of feeder main extension necessary at 22nd Street Pumping Station	284,600	
Omission of feeder main extension necessary at 14th Street Pumping Station	438,700	
Property and salvage made available from the three stations when abandoned (appraised value from annual report)—		
14th Street Pumping Station	502,000	
22nd Street Pumping Station	448,000	
Harrison Street Pumping Station	269,000	
Total		$2,817,300
This would leave a difference of		$1,773,550

that the one station would cost in present investment over and above the plan of operating the three stations.

There would, however, be a difference in cost of operation per million foot gallons between the three stations and the one station of 2.66 cents, which would amount to a saving in the annual cost of operation of approximately $170,000 per year in favor of the new station. This saving would retire the difference in investment in approximately ten years, and, of course, be a continued saving thereafter.

As this district has now very nearly reached its maximum requirements, it is estimated there will be no further increase in the capacity of the station.

The large reserve figured for this station is planned as a standby service for the "Loop" district in case of any accident to the Chicago Avenue Pumping Station. The equipment planned would furnish the best service to the district on the most economical basis, and would be much more efficient and less expensive than the present method of supplying water to this district.

During the time this new station is building, or until the end of 1924, it will be necessary to operate these three stations. Therefore, request has been made for $36,500 to be expended on the 14th Street Pumping Station for new engine for generator set, chlorine equipment and fish screens.

For the 22nd Street Station, request has been made for $80,000 to complete work already started, remove steam units, install new heating system, new check valves and new chlorine equipment, this work all to be done in 1920 in order to put these two stations in proper condition to operate until the new station is ready.

A great deal of time and study has been devoted to this district in order to arrive at these conclusions, and the merit of the plan of supplying the whole district from one station cannot be questioned.

68th STREET PUMPING STATION.

This station was acquired through the annexation of the Village of Hyde Park, and has been the source of a great deal of trouble and worry to the Bureau of Engineering for many years past.

The station up to a short time ago was equipped with two horizontal compound pumping units and four turbine-driven centrifugal pumping units. Nos. 1 and 2 of the turbine-driven pumps have never given satisfactory service since their installation. Nos. 4 and 5 are not satisfactory nor dependable, and Nos. 6 and 7 have been in service for approximately twenty years, and have practically outlived their usefulness.

In view of these conditions, we have planned (and the work is now under way) for the complete electrification of this station. Pump No. 1 is now temporarily equipped with a motor drive, and No. 3 is a new motor-driven centrifugal. It is intended to replace the turbine drive on pump No. 2 with a motor, and to install in the place of pumps Nos. 4 and 5 one 45 million gallons per day motor-driven centrifugal.

As soon as this work is completed, all steam units and equipment will be removed from the station with the exception of what necessary equipment is required for the heating system.

This work is all to be done during the year 1920 at an estimated cost of $274,000.

In 1930 to 1935, the maximum requirements for this station will be approximately 187 million gallons per day. Therefore, in 1931, it is planned to add two 50 million gallons per day motor-driven centrifugals, bringing the total capacity of the station up to 200 million gallons per day plus 50 million gallons reserve.

In 1940 to 1955, the maximum requirements will be further increased to approximately 228 million gallons per day. Therefore, in 1940, an addditional

50 million gallons per day motor-driven centrifugal would be added, bringing the total capacity of the station up to 250 millon gallons per day plus 50 million gallons reserve.

All of the work set forth in the above is estimated to cost $424,000, of which $274,000 is to be spent in 1920, $100,000 in 1921, and $50,000 in 1922.

At the end of 1920, under this plan, this station will be in good operating condition, and at that time and thereafter be of sufficient capacity to take care of the maximum load in this district, with sufficient reserve to assist in case of accident in neighboring districts.

While this station is located on the lake shore, and therefore pumping water in three directions only, it was found advisable not to move it to the center of its district as was planned at Lake View. This decision was due to the fact that the underground system is laid out in such a manner as to preclude securing any appreciable benefit from the use of the present system, and to install an entirely new one could not be justified in this case.

ROSELAND PUMPING STATION.

This station is one of the newer stations, is strictly modern, and has given very good service from the standpoint of operation.

However, the district that this station has been forced to supply has made it impossible to deliver good service, as Roseland Station is now supplying water to a territory approximately 85 square miles in area, and forcing water over ten miles distant from the station. This condition will not allow even reasonably good service to be maintained in a large part of the district, as the haul is so long and friction losses so great that the pressure is far below normal by the time the water reaches its destination.

Under the new plans, it is intended, as soon as 68th Street Pumping Station's capacity has been increased, to supply a large portion of the eastern side of the Roseland Pumping Station's district from the 68th Street Station. This will allow Roseland Station to deliver more water to the north and west.

This will be a temporary expedient to give service in the district now supplied by Roseland Station for the next few years. It will be an improvement over present conditions as to service.

As soon as the new William Hale Thompson Pumping Station is in operation, Roseland Pumping Station's territory will be greatly diminished, leaving only that portion generally south of 79th Street to be supplied.

During the year 1920 it is intended to install new stokers, new soot boilers, new chlorine equipment, coal storage improvements and to make repairs and alterations to engine No. 3, at a total estimated cost of $69,000.

In 1930 to 1935 the maximum requirements of the district then allotted to Roseland Pumping Station will be approximately 102 million gallons per day. As the station is of 100 million gallons capacity, it is intended, therefore, in 1929, to install one 60 million gallons per day turbine-driven centrifugal, with necessary building changes and pit.

In 1940 to 1955, a further increase in maximum requirements is estimated at 143 million gallons per day, at which time the capacity of the station, with the equipment as planned, would be 135 million gallons per day plus 25 million gallons reserve.

The total estimated cost of this work is $199,000, of which $69,000 would be expended in 1920, and $130,000 in 1929.

At the end of 1923, or when the new William Hale Thompson Pumping Station is completed, this station will not only give good service but be able to do so on a more economical operation cost, as the district to be supplied will be much smaller than at present. It will have at all times sufficient capacity to take care of the maximum load in this district, with sufficient reserve to assist in case of accident to neighboring districts.

WILLIAM HALE THOMPSON PUMPING STATION.

A site for this station was purchased some time ago at 61st Street and Western Avenue, but, as has been shown by several reports on file in the City Engineer's office, it is not the proper location for this station from the standpoint of either service or economy in operation.

It was and is recommended, therefore, that a site be purchased at 47th Street and Western Avenue. While this site will require a greater original investment than the site at 61st Street and Western Avenue, the difference in the annual cost of operation and maintenance will amount to over $82,000 a year in favor of the 47th Street site. This saving will retire the difference in the cost of the two sites, including the station, real estate, tunnels, mains, etc., in approximately four years.

This large saving in the cost of maintenance and operation is due to the fact that the major portion of the water pumped by this station would be used in the northeast section of the district. It is, therefore, only good engineering to place the source of supply as near the center of demand as possible.

The center of demand is now located a little bit to the east and north of the site selected. The drift of the growth, as shown by analysis, is in a westerly direction, and would center around 47th Street and Western Avenue.

This station is to be 300 million gallons capacity plus 40 million gallons reserve. The total cost is estimated to be $3,735,000.

Construction is to be started in 1920, during which year it is planned to expend $500,000. Work is to be completed and the station put in operation the latter part of 1923.

In 1925 to 1930, the maximum requirements of this district will be approximately 198 million gallons per day. The station when finished would be completed up to the point of 195 million gallons capacity per day plus 25 million gallons reserve.

In 1930 it is planned to complete the station by adding two 60 million gallons per day turbine-driven centrifugals and two boilers. This would complete the station as originally planned, with a sufficient capacity to take care of the maximum load in this district at all times, and with reserve enough to assist in case of accident to neighboring districts.

Yearly program of expenditures:

1920	$ 500,000
1921	1,000,000
1922	750,000
1923	1,165,000
1930	320,000
Total	$3,735,000

SOUTHWEST PUMPING STATION.

This station would be located in the neighborhood of 73rd Street and Central Park Avenue, and would supply a part of the district now supplied by

Roseland Pumping Station, which will later be taken over in part by the William Hale Thompson Pumping Station as a temporary proposition.

It is estimated that the growth of this district will be such that in 1930 to 1935 the maximum requirements will be in the neighborhood of 83 million gallons per day.

It is planned, therefore, to start construction work on this station in 1927, to be completed in the latter part of 1929, at which time the station will be equipped with two 30 million gallons per day turbine-driven centrifugal pumps.

In 1932 an additional 50 million gallons per day turbine-driven centrifugal pump would be added, together with one new boiler, making the capacity of the station at that time 80 million gallons per day plus 30 million gallons reserve.

In 1940 to 1955 the maximum requirements of this district will be further increased to approximately 140 million gallons per day.

Therefore, in 1940, it is planned to add another 50 million gallons per day turbine-driven centrifugal pump and another boiler, making the total capacity of the station 130 million gallons per day plus 30 million gallons reserve.

The total estimated cost of this work is $1,050,000, to be expended:

1927	$200,000
1928	200,000
1929	325,000
1932	160,000
1940	165,000

RECAPITULATION

Pumping Station Expenditures

Pumping Station	A	B	Total
William Hale Thompson	$ 3,735,000	....	$ 3,735,000
Chicago Avenue	535,000	$ 20,000	555,000
Springfield Avenue	260,000	434,300	694,300
Central Park Avenue	260,000	320,900	580,900
Lake View	2,200,000	248,000	2,448,000
Mayfair	525,000	100,000	625,000
Roseland	130,000	69,000	199,000
Southwest	1,050,000	....	1,050,000
68th Street	194,000	230,000	424,000
Town	2,550,000	....	2,550,000
22nd Street		80,000	80,000
14th Street		36,500	36,500
Totals	$11,439,000	$1,538,700	$12,977,700

Column "A" includes necessary new work according to plan as outlined.

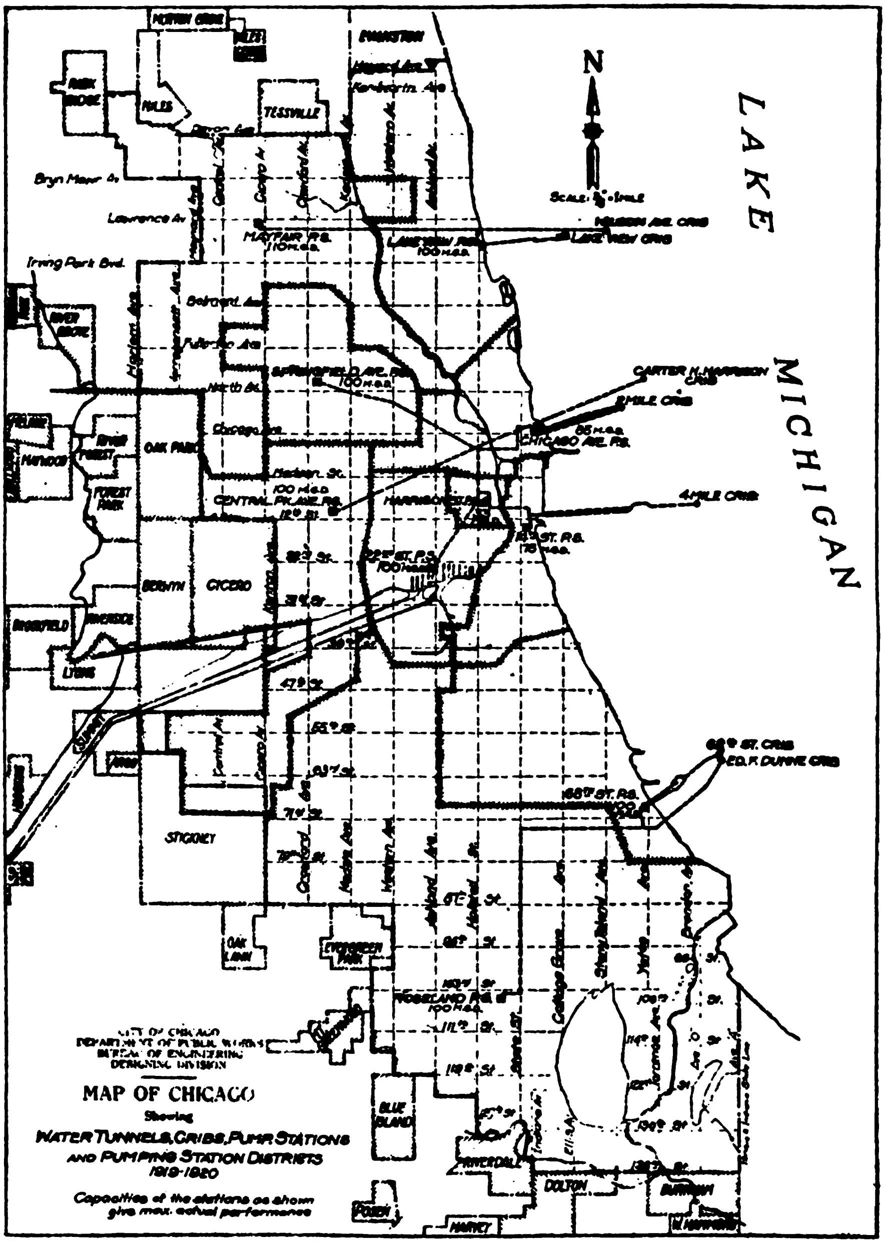
Column "B" is for rehabilitation and replacements.

The above figures are for a program of reconstruction up to and including 1940.

The total estimate for the period up to 1950 in a round figure of $500,000 per year to be expended on pumping station work, is shown from 1941 to 1950, which would be in addition to the above.

On the following sheets indicated as "A" and "A1" a tabulation of maximum requirements, capacity and reserve for each pumping station is shown, together with the totals for the entire city.

The figures designated as "unit reserve" are the total of units as a whole. The figure "total reserve" is the total reserve in absolute million gallons over and above the requirements. The per cent of the maximum requirements is also noted.



CITY OF CHICAGO
DEPARTMENT OF PUBLIC WORKS
BUREAU OF ENGINEERING
DESIGNING DIVISION

MAP OF CHICAGO
Showing
WATER TUNNELS, CRIBS, PUMP STATIONS
AND PUMPING STATION DISTRICTS
1919-1920

Capacities of the stations as shown give max. actual performance

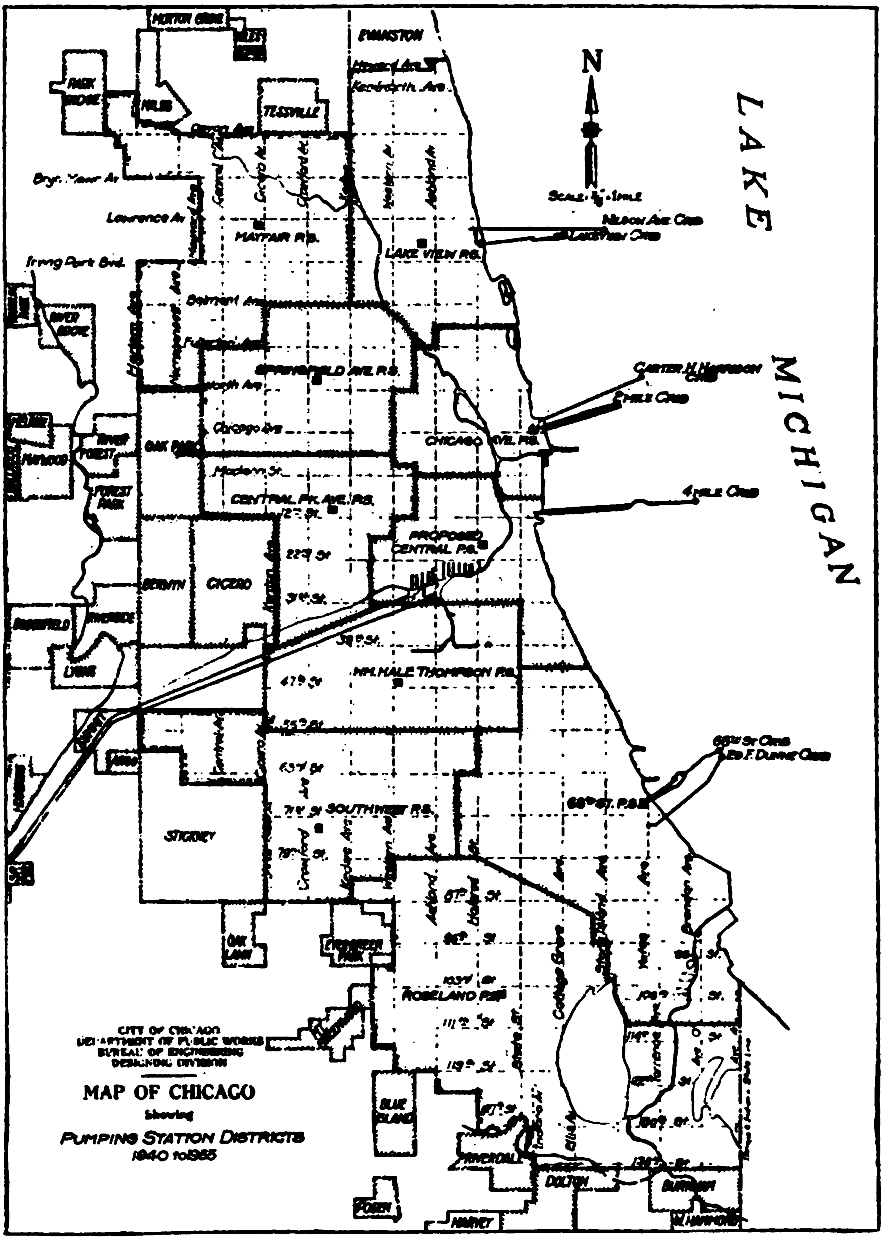
PUMPING STATION REQUIREMENTS
Capacity and Reserve
1920 to 1955

Station	1919-1920			1920-1925			1925-1930		
	M.G. Req.	M.G. Cap.	M.G. Res.	M.G. Req.	M.G. Cap.	M.G. Res.	M.G. Req.	M.G. Cap.	M.G. Res.
Lake View	103	120	......	98	95	25	103	95	25
Mayfair	75	85	25	107	110	60	142	133	17
Springfield Avenue	90	85	40	71	110	50	104	110	50
Central Park Avenue	96	97	40	87	120	25	121	120	25
Chicago Avenue	110	99	......	152	150	60	163	150	60
W. H. Thompson	......	......	......	......	......	......	193	195	25
22nd Street	......	100	......	......	100	......	......	......	......
Harrison Street	326	32	32	274	32	32	......	......	......
14th Street	......	100	32	......	100	32	......	......	......
Southwest	......	......	......	......	......	......	50	60	......
68th Street	135	110	24	208	210	......	163	165	45
Roseland	137	100	......	112	100	......	75	75	25
Town	......	......	......	......	......	......	240	240	120
Totals	1072	928	193	1109	1127	284	1354	1343	392
Total Reserve	......	......	......	302	......	......	381	......	......
Per cent Unit Reserve	......	......	......	25	......	......	25	......	......
Per cent Total Reserve	......	......	......	27	......	......	28	......	......

NOTE—All reserves shown in 1919 not available—highest recorded 948.

PUMPING STATION REQUIREMENTS
Capacity and Reserve
1920 to 1955

Station	1930-1935			1935-1940			1940-1955		
	M.G. Req.	M.G. Cap.	M.G. Res.	M.G. Req.	M.G. Cap.	M.G. Res.	M.G. Req.	M.G. Cap.	M.G. Res.
Lake View	158	180	60	180	180	60	204	240	60
Mayfair	126	133	17	140	133	17	170	165	25
Springfield Avenue	117	135	85	171	195	25	194	195	75
Central Park Avenue	132	180	85	158	180	85	170	180	85
Chicago Avenue	207	210	50	203	210	50	211	210	50
W. H. Thompson	237	255	85	290	280	60	325	315	25
Southwest	83	80	30	110	110	......	141	130	30
68th Street	187	200	50	193	200	50	228	250	50
Roseland	102	100	60	122	135	25	143	135	25
Town	227	240	120	232	240	120	245	240	120
Totals	1576	1713	642	1799	1863	485	2031	2060	545
Total Reserve	779	......	......	549	......	......	574	......	......
Per cent Unit Reserve	40	......	......	27	......	......	27	......	......
Per cent Total Reserve	49	......	......	31	......	......	29	......	......



MAP OF CHICAGO
showing
PUMPING STATION DISTRICTS
1940 to 1965

CRIBS AND TUNNELS.

Chicago has now seven cribs or intakes in Lake Michigan, the condition of which is as follows:

TWO MILE CRIB.

This crib just east of the Chicago Avenue Pumping Station was built in 1867, and is connected with the shore by two seven-foot tunnels and one five-foot tunnel. In this crib the intake to the north seven-foot tunnel is partly obstructed by rock filling, and the gates in the intake are too high, cutting down the flow to the five and seven-foot south tunnels.

The condition of the crib at the present time is very serious, in that the protection to the crib has been undermined, and there is danger in case of severe storms of losing the entire crib. We are, therefore, taking the precaution of making what we believe to be the necessary repairs to this crib to protect it through this winter. It is the plan, however, and appropriation has been made, to connect these three tunnels through a lake shaft to a future tunnel, as will be taken up later. This would then allow the city to abandon the Two Mile Crib.

FOUR MILE CRIB.

This crib was built in 1891, and is connected to the shore by an eight-foot tunnel. Due to the location of this crib and certain lake currents from South Chicago, the water from this crib and tunnel for a number of years has been polluted with all manner of debris, such as cinders, small pieces of wood, leather, etc., which in turn have lodged in the valves of the pumps at the 14th Street Pumping Station, causing great loss to the city through slippage. Some pieces have passed through the pump and caused considerable trouble in the meters as far north as Randolph Street.

It is planned, at the 14th Street Pumping Station, to install a large screen in the wet well that will overcome this difficulty.

When this crib was built, due to an error, its full capacity was cut down by placing of the apron or protection platform over the two south ports. It is intended, however, to keep this crib in operation under the general plan.

HYDE PARK CRIB.

This crib is located east of the 68th Street Pumping Station, and was built in 1896. It is connected to the shore by a seven-foot diameter tunnel.

This crib has just undergone extensive repairs, the most important of which is the rebuilding of the protection platform which was found quite necessary in view of the fact that the timber and piles were in a very dilapidated and dangerous condition. This work completed gives the crib an up-to-date protection of reinforced concrete, which has been so installed as to make this and its twin, the Edward F. Dunne Crib, the feature cribs of the city. The platform has not only been put in condition to protect the crib but also provided with light stanchions and chain railings and a moat through which small launches can pass into the inner basin. This crib in the future will be the crib to which visitors to the city will be taken.

EDWARD F. DUNNE CRIB.

Connected with the Hyde Park Crib there is what is known as the Edward F. Dunne Crib, built in 1912. It is connected to the shore by a 14-foot diameter tunnel.

This crib, though comparatively new, was found to be in very bad condition. The outer and inner walls of the crib had been poorly constructed, and had deteriorated in a dangerous manner. These errors have likewise been corrected.

LAKE VIEW CRIB.

This crib was built in 1896, and connected to the shore by a seven-foot diameter tunnel, but the same has been abandoned, or, rather, out of service, due to the fact that in October of 1918, an attempt was made to connect the lake shaft of this crib with the new Wilson Avenue tunnel, but because of some mishap the effort failed, and the Lake View Pumping Station had to be supplied with water from the Wilson Avenue tunnel through a short branch to that station.

It is planned to complete this connection during 1920, and then remove the present Lake View Crib.

CARTER H. HARRISON CRIB.

This crib was built in 1900 and was connected to the shore by a ten-foot diameter tunnel. Both tunnel and crib are in A-1 condition.

WILSON AVENUE CRIB.

This crib was started in 1915. Construction will be completed during 1920.

A great deal of difficulty has been encountered in the construction work of this crib, but was finally overcome and the work is now nearing completion.

There is a thirteen-foot diameter tunnel from this crib to the shore.

Briefly, a review of the crib and lake tunnel situation brings out the fact that we have one (the Lake View Crib) that is out of service; that the Two and Four Mile Cribs, through errors in construction, are unable to run at the capacity intended, and that the Carter H. Harrison, Wilson Avenue, Hyde Park and Edward F. Dunne Cribs are in good condition and can be depended upon.

LAND TUNNELS.

WILSON AVENUE TUNNEL.

This tunnel, twelve feet in diameter, supplies the Mayfair Pumping Station, from where it runs to shore connection from the Wilson Avenue Crib.

SOUTHWEST LAND TUNNEL.

This tunnel is now furnishing a part of the water to 68th Street Pumping Station and all of the water to Roseland Pumping Station. It is nine feet in diameter from Roseland Station north to 73rd Street, and twelve feet in diameter from this point to the connection with the lake drift from the Edward F. Dunne Crib.

Although this tunnel was carried to a point at State and 73rd Streets twelve-foot diameter, it was then reduced in size to nine-foot diameter, from that point west for a distance of 714 feet, the gate to this nine-foot tunnel being but six feet. It is intended to correct this condition and extend the tunnel twelve feet in diameter to the new William Hale Thompson Pumping Station.

BLUE ISLAND AVENUE TUNNEL.

This tunnel was built in 1911, eight feet in diameter and runs from the 22nd Street Pumping Station, connecting at the lake shore with the three tunnels from the Two Mile Crib. It was intended that this tunnel should add to the supply of the Harrison Street and 14th Street Pumping Stations, but it was located at an elevation so high that, if the gate at the shaft of the connecting tunnel is opened, the supply to 22nd Street Station is dangerously reduced.

POLK STREET TUNNEL.

This tunnel, seven feet in diameter, was built in 1907, and runs from the 14th Street Pumping Station to the Harrison Street Pumping Station, with a connection to the Blue Island Avenue tunnel and the shore end of the tunnel from the Four Mile Crib.

As has been stated before, due to error in the Four Mile Crib, the full capacity of this tunnel is not available.

NORTHWEST LAND TUNNEL.

The tunnels now supplying the Springfield Avenue and Central Park Avenue Pumping Stations were built in 1900 and are eight feet in diameter. They run east in the form of a Y, coming together in Halsted Street near Ohio Street. From there they are connected in one tunnel with the shore end of the tunnel from the Carter H. Harrison Crib.

These two tunnels will be of insufficient capacity to supply the two stations. Further, they are constructed under private property, and should be abandoned at the earliest possible date, due both to their insufficient capacity and to the danger of maintaining tunnels under private property, which has been demonstrated in the past.

REMARKS.

These tunnels, as will be noted from the plat, comprise three separate and distinct systems. The north and south systems are each capable of delivering more water than is now being used, but the central system is not of sufficient capacity to meet present demands. These three systems being so isolated, an accident in any one of them means the crippling of practically one-third of Chicago's water system, with absolutely no chance to give assistance from either of the other two systems.

NEW TUNNELS.

From the study of the tunnel system it is found necessary and advisable to construct one new lake crib and the following lake and land tunnels:

73rd STREET EXTENSION TO SOUTHWEST LAND TUNNEL.

This tunnel would be twelve feet in diameter, connecting with the present gate shaft in the Southwest Land Tunnel, running due west to Western Avenue, where a gate shaft would be installed for future connections.

This tunnel is estimated to cost complete $1,620,000, of which $440,000 will be expended in 1920 to construct the working shaft and 4,000 feet of tunnel, all work on this section to be completed in the year 1923.

Yearly program of expenditures:

1920	$ 440,000
1921	670,000
1922	400,000
1923	110,000
Total	$1,620,000

WESTERN AVENUE EXTENSION TO SOUTHWEST LAND TUNNEL.

This tunnel will be twelve feet in diameter, connecting with the 73rd Street Extension at 73rd Street and Western Avenue and running north under Western Avenue to approximately 47th Street. There a gate shaft will be installed for future connections, as well as necessary shafts for the William Hale Thompson pumping station.

The total work on this section is estimated to cost $1,790,000, of which $340,000 will be expended in 1920 to construct the working shaft and 3,000 feet of tunnel, the work to be completed in the year 1923, at which time the water could be turned into these tunnels.

It is contemplated to supply the William Hale Thompson Pumping Station through these tunnels up to the year 1930, when a further connection would be made to this tunnel from the north, as by that time the capacity of the Southwest Land Tunnel will be needed to supply the three stations to the south.

Yearly program of expenditures:

1920	$340,000
1921	800,000
1922	600,000
1923	50,000
Total	$1,790,000

SOUTHWEST STATION TUNNEL.

This tunnel, ten feet in diameter, would run from the proposed Southwest Pumping Station to the gate shaft at 73rd Street and Western Avenue. Work on this section would start in 1927, to be completed in 1929. The total estimated cost of this tunnel is $600,000.

Just beyond the Southwest Station a gate shaft would be installed in this tunnel for future connections, which would allow the building of a station to the south or west of this point in the future and connection of the same to this tunnel system.

Yearly program of expenditures:

1927	$110,000
1928	280,000
1929	210,000
Total	$600,000

MIDLAND LAKE AND LAND TUNNEL.

It is planned to place the new William Hale Thompson Crib alongside of the Carter H. Harrison Crib. This will not only allow the two cribs to be operated by one force of men, but is found desirable due to the fact that experience has proven that the cribs north of the river furnish better water and are troubled less by contamination and refuse than those south of the river.

It is planned to start construction on this crib in 1920, to be completed in 1923. The total estimated cost is $700,000, of which $200,000 would be expended in 1920, $100,000 in 1921, $200,000 in 1922, and $200,000 in 1923.

From this crib it is planned to drive a 20-foot diameter tunnel west to a short shaft in the neighborhood of Chicago Avenue, where connections would be made to the four existing tunnels. From there a 20-foot diameter tunnel would run to Western Avenue.

In the year 1922 it is planned to put down a working shaft at the Two Mile Crib and start driving the tunnel to the new William Hale Thompson Crib. Work on this section would be completed in the year 1923, at which time connections would be made with the three tunnels to the Two Mile Crib, thereby taking that crib out of service and allowing the water to come in through the new crib.

During that year a shaft would be sunk at the shore, and work would be started driving this tunnel east and west from that point.

Work would be continued until 1928, when this section of the tunnel would be completed, and all connections made. Water could then be turned into this tunnel.

It is intended to install a spur and gate shaft to this tunnel at Halsted Street for future connection to the new station in the neighborhood of Halsted Street and the river.

Yearly expenditures for this work would be as follows:

1922	$ 530,000
1923	1,310,000
1924	2,160,000
1925	1,460,000
1926	849,600
1928	150,000
Total	$6,459.600

WESTERN AVENUE SECTION OF MIDLAND TUNNEL.

This tunnel will be worked from a shaft in the neighborhood of Chicago and Western Avenues, from which point it will be sixteen feet in diameter, to Fillmore Street, with a gate shaft for future extension to the south. On Fillmore Street a twelve-foot diameter tunnel from Western Avenue to the Central Park Avenue Pumping Station with shaft to the station and gate shaft for future connection will be worked. Going north from the working shaft at Chicago and Western Avenues there will be a fourteen-foot diameter tunnel to Bloomingdale Road, where there will be a gate shaft for future connection. West from this point there will be a ten-foot diameter tunnel from Western Avenue to Springfield Avenue Pumping Station, with shaft to the station.

The gate shaft at Central Park Avenue Pumping Station is placed there so that, if in the future a pumping station is built to the west of the city, connection can be made to the tunnel system at this point.

There are also a gate shaft and spur furnished for the same purpose at the shaft at Chicago and Western Avenues.

This will give four points at which our tunnel system could be tapped, viz., Mayfair Pumping Station, Chicago and Western Avenues, Central Park Avenue Pumping Station and the Southwest Pumping Station.

While it is planned under this general system to take care of all the existing towns now bordering on the limits of Chicago and in general the territory that is partially settled and now outside of the city limits, there undoubtedly will come a time not so far in the future when these parts will become so thickly settled that, regardless of whether they are in or outside of the corporate limits of the city, they will need modern pumping stations to take care of their water supply, as our present pumping stations could not be counted on from a standpoint of economy to deliver water this excessive distance in any large quantity. At this time these shafts will come into use and prove a considerable saving in making a connection, as well as eliminating any chance of disrupting, even though temporarily, the water system. There will be a sufficient capacity in this tunnel system to take care of approximately 600 million gallons per day at these outside stations without overloading the system.

The work on this Western Avenue Section of the Midland Tunnel would be started in 1923 and finished in 1928, at which time the water would be turned in and the tunnel placed in service.

The expenditures for this work would be as follows:

1923	$ 320,000
1924	1,048,000
1925	840,000
1926	814,000
1927	482,800
1928	275,000
Total	$3,779,800

WESTERN AVENUE TUNNEL, SOUTH SECTION.

This tunnel would be fourteen feet in diameter, running from the gate shaft at Fillmore Street and Western Avenue to the William Hale Thompson Pumping Station. This section of tunnel would be necessary to carry sufficient water to the William Hale Thompson Pumping Station, as by 1930 to 1935 the bulk of the capacity of the Southwest Land Tunnel will be required for the three stations to the south. This will then allow the water for the William Hale Thompson Pumping Station to come in from the William Hale Thompson Crib.

This work would be started in 1927 and completed in 1930, expenditures to be as follows:

1927	$ 520,000
1928	960,000
1929	960,000
1930	216,000
Total	$2,656,000

WESTERN AVENUE TUNNEL, NORTH SECTION.

This tunnel would be twelve feet in diameter, running from a gate shaft at Western and Wilson Avenues, to the gate shaft at Western Avenue and Bloomingdale Road. This tunnel would make a slight difference in wet well elevations at the stations in this neighborhood, but is designed primarily as insurance.

In case of accident to the Wilson Avenue Crib, without this tunnel in, the north section of the city would be without water. With this tunnel in, however, a complete connection is made between all the tunnels and all the cribs, so that no matter what happens to any one of our cribs the load can be shifted and carried by another part of the system.

TUNNEL TO PROPOSED NEW STATION.

This tunnel would be twelve feet in diameter and would connect with the present Polk Street and Blue Island Avenue tunnels, from where it would run to the new station.

Work would be started on this tunnel in 1923 and completed in 1924, with an expenditure of $170,000 in 1923, and $420,000 in 1924, or a total of $590,000.

LAKE VIEW TUNNEL.

This tunnel would be ten feet in diameter, with connections to present Lake View shore shaft, from where it would run to the proposed new location of the Lake View Pumping Station.

Work would be started on this tunnel in 1933, with an expenditure that year of $180,000, and completed in 1934, with an expenditure of $300,000, making a total expenditure of $480,000.

WILSON AVENUE CRIB.

As was stated before, this crib is still under course of construction. Request was made in the 1920 budget for $180,000 to take care of present obligations and to complete the work, together with the removal of spoil, tunnel connection at Lake View Crib, and the removal of Lake View Crib.

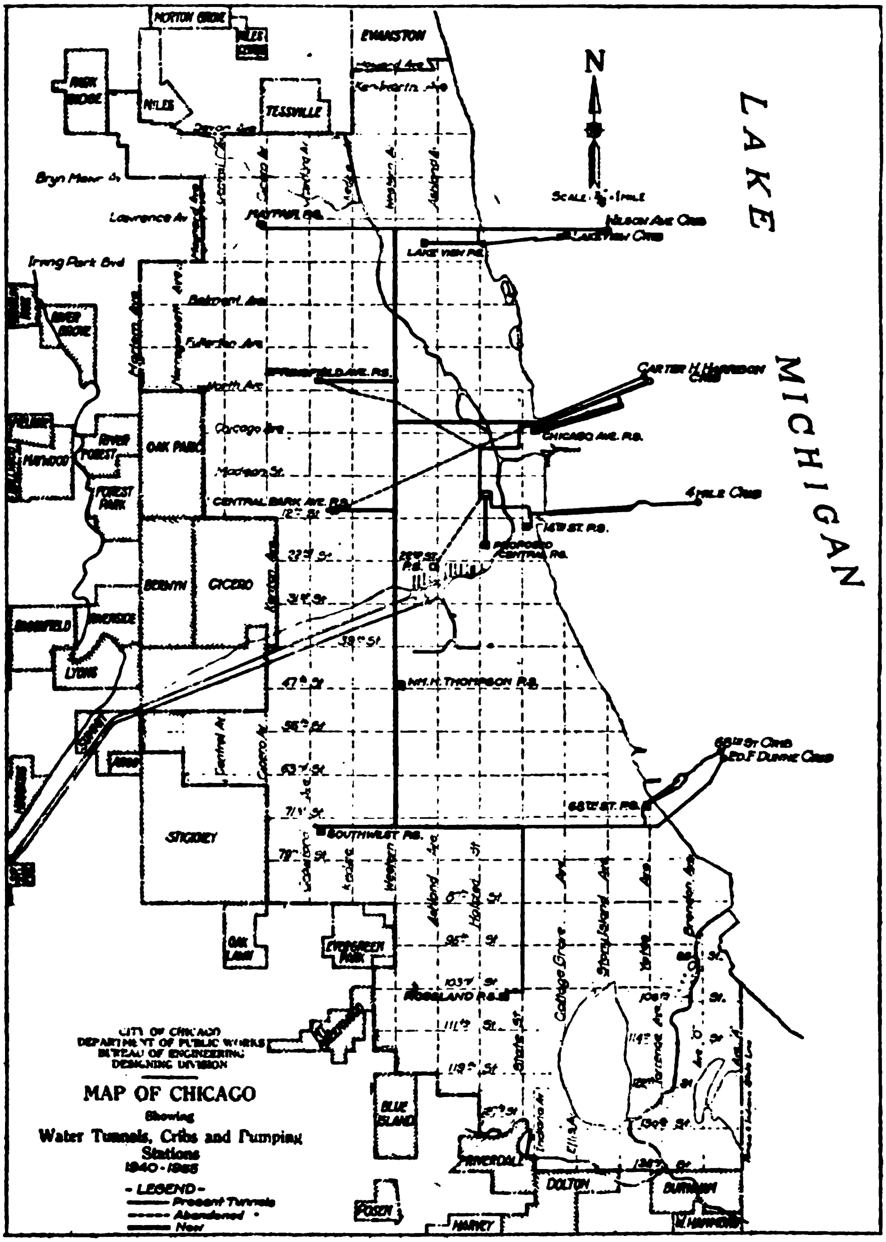
This whole tunnel system when completed will not only be very flexible but will be of sufficient capacity to materially raise the wet well elevation in all of the pumping stations. This would be especially true in the earlier years of this program. As time went on and the demand grew heavier, this difference would naturally become smaller, but would still make a vast difference in the cost of operation of the whole system.

To give an example of just what this means: If we are enabled to raise the wet well elevation in all of the pumping stations one foot at a time when we are pumping on an average of 1,000 million gallons per day, it would make a saving in the annual cost of operation, based on our most economically operated station, of $18,250. This will be an item of importance, as the tunnel plans as outlined will make a difference in the wet well elevations of from two to ten feet.

It would be possible to cramp the size of these tunnels and still be able to operate. However, the saving would be very short-lived, as an increase in the annual cost of operation would be felt immediately, and it would be a matter of only a few years until further lake and land tunnels were necessary.

The fallacy of building too small is shown in our present system and is largely responsible for the large amount of new building and enlarging that must be done now and in the near future.

The tunnel system as laid out will supply all reasonable demands of the city and of the territory that was taken outside of the city limits in these figures up to the maximum possible growth of the territory. Any further tunnel work than in this outline would be necessary only under the condition that the city would annex a great deal of territory to the extreme north or south.



CITY OF CHICAGO
DEPARTMENT OF PUBLIC WORKS
BUREAU OF ENGINEERING
DESIGNING DIVISION

MAP OF CHICAGO
Showing
Water Tunnels, Cribs and Pumping Stations
1940-1966

- LEGEND -
Present Tunnels
Abandoned
New

Beyond that, the system is sufficient for all needs that can arise in the territory considered.

FEEDER MAINS.

This subject is too big to cover in detail in this kind of a report beyond the expenditures planned. However, a complete plan of the city has been made by the Water Pipe Extension Division, showing all proposed new feeder mains to be laid up to and including 1940, and the following figures are based on estimates made from these maps:

Water Pipe Extension.

Estimated for —		
1920	$1,000,000	
1921	1,000,000	
1922	1,000,000	
1923	750,000	
1924	750,000	
1925	750,000	
		$5,250,000
1926	$ 826,800	
1927	826,800	
1928	826,800	
1929	826,800	
1930	826,800	
		$4,134,000
1931	$ 826,800	
1932	826,800	
1933	826,800	
1934	826,800	
1935	826,800	
		$4,134,000
1936	$ 826,800	
1937	826,800	
1938	826,800	
1939	826,800	
1940	826,800	
		$4,134,000
Total		$17,652,000

In laying out this work, the Water Pipe Extension Division has endeavored to use every available part of the present system, and such additions as have been made were not recommended until a thorough study was made of each section. In many cases there were several plans submitted from which they drew their conclusions.

The system when completed will be thoroughly flexible and of sufficient size and capacity to eliminate all undue friction loss. It will be capable, in case of accident either to mains or to one of the pumping stations, by a little manipulation of values, of obtaining service in any part of the city regardless of these accidents.

BUILDING PROGRAM REHABILITATION

Year	Pumping Stations	Tunnels	Cribs and Miscl.	Water Pipe Extension	Totals
1920	$ 2,200,100	$ 780,000	$439,000	$ 1,000,000	$ 4,419,100
1921	1,929,300	1,470,000	100,000	1,000,000	4,499,300
1922	1,250,000	1,530,000	200,000	1,000,000	3,980,000
1923	2,191,300	1,960,000	200,000	750,000	5,101,300
1924	550,000	3,628,000	....	750,000	4,928,000
1925	187,000	2,300,000	....	750,000	3,237,000
1926	....	1,663,600	....	826,800	2,490,400
1927	200,000	1,112,800	....	826,800	2,139,600
1928	200,000	1,665,000	....	826,800	2,691,800
1929	455,000	1,170,000	....	826,800	2,451,800
1930	790,000	216,000	....	826,800	1,832,800
1931	600,000	....	....	826,800	1,426,800
1932	660,000	....	....	826,800	1,486,800
1933	850,000	180,000	....	826,800	1,856,800
1934	250,000	300,000	....	826,800	1,376,800
1935	....	....	....	826,800	826,800
1936	....	....	....	826,800	826,800
1937	....	....	....	826,800	826,800
1938	....	....	....	826,800	826,800
1939	....	....	....	826,800	826,800
1940	665,000	....	....	826,800	1,491,800
1941	500,000	....	....	500,000	1,000,000
1942	500,000	....	....	500,000	1,000,000
1943	500,000	....	....	500,000	1,000,000
1944	500,000	....	....	500,000	1,000,000
1945	500,000	440,000	....	500,000	1,440,000
1946	500,000	800,000	....	500,000	1,800,000
1947	500,000	655,000	....	500,000	1,655,000
1948	500,000	....	....	500,000	1,000,000
1949	500,000	....	....	500,000	1,000,000
1950	500,000	....	....	500,000	1,000,000
Totals	$17,977,700	$19,870,400	$939,000	$22,652,000	$61,439,100

Items of $500,000 per year for 1941 to 1950 under heading of "Pumping Stations" and "Water Pipe Extension" are general estimates only to cover expenditures in arriving at financial program, and are considered ample as far as can be seen at this time to take care of extraordinary construction work at that time.

CHLORINATION OF WATER SUPPLY.

The importance and necessity of chlorinating the city water supply is so apparent that it needs no explanation in this report.

The enviable position that Chicago now holds, that is, the healthiest large city in the world, and with the lowest death rate from water-borne diseases, is due to the chlorination of the water supply.

In order to maintain this standard, the system must be put on a better operating basis. An investigation conducted recently by the City Engineer brought out the facts that the present system had the following shortcomings:

First—There are several systems installed which give no standardization to our mode of operation or upkeep.

Second—Under the present methods it is not properly diffused and mixed with the water, so that portions of the water are overtreated and some portions not treated at all.

Third—Most of the apparatus are not automatic in operation, and, therefore, require constant observation, and they are naturally subject to irregularities of supply caused by the human element in the operation.

Fourth—The method of introducing chlorine in the wet well as now practiced has proven unreliable, due to the fact that the fish absorb a great quantity of the gas, and the water is, therefore, undertreated.

Fifth—Most of the apparatus now installed are not graduated or marked sufficiently to give any accuracy in feed. Therefore, the whole responsibility for feeding the proper amount of gas rests with the operator.

Due to these facts, the City Enginer instigated an investigation of chlorine equipment both in this city and in many other cities, appointing a committee to conduct a research in this subject, their report and recommendation now being on file in the City Engineer's office.

As there were no funds for the purpose of improving the chlorinating system, nothing could be done upon the findings of this committee.

However, the Wallace & Tiernan Company volunteered to furnish, at their own expense, a complete set of equipment, conforming to the recommendations of the above mentioned committee, to be installed at the Mayfair Pumping Station, work on the same now being under way. This equipment is guaranteed by the Wallace & Tiernan Company to eliminate the undesirable features as set forth above, and is furnished without obligation on the part of the city unless it fulfills this guarantee, at which time the Commissioner of Public Works would recommend its purchase.

It is for these reasons that the City Engineer has included certain sums for chlorine equipment in his 1920 estimates for each station.

Due to the fact, however, that we had no definite figure on which to base an estimate at the time the budget was prepared, it was decided to include a flat sum of $20,000 for each station for rehabilitation of the chlorine plant as necessary.

Since then, however, we have secured more definite figures, and we can now adjust them as follows:

Station	To be expended in 1920	To be expended in 1921
Mayfair	$20,000	
Lake View		$10,000
Chicago Avenue	15,000	
Springfield Avenue	5,000	10,000
Central Park Avenue	5,000	10,000
Harrison Street		10,000
14th Street		10,000
22nd Street	10,000	5,000
Roseland		15,000
68th Street	15,000	

It is understood, of course, that none of this money will be expended unless the Mayfair installation proves entirely satisfactory.

FINANCE.

On the page headed "Water Fund Program" will be found a tabulation of expenditures and revenue from the Water Fund for the years 1920 to 1950 inclusive.

In compiling these figures the rehabilitation and new construction work were set down as noted in the foregoing report.

The items under ordinary expense include all items that are now chargeable under present practices to the Water Fund.

The increases in population and growth of the city, together with the yearly pumpage in million gallons, were figured from the data as noted in the early part of this report, and the percentage of increase shown by these figures was used as a basis of figuring future expenditures in those departments affected by this growth.

All estimates are based on present day prices.

As will be noted in the items under "Revenue" an increase of $350,000 per year until 1940, and $300,000 per year thereafter is used. This is considerably less than the average increase in revenue for the last few years, and is a very conservative estimate in that under the general plan it is intended to slightly increase and continue with our metering program until in approximately 1940 sixty per cent of the service will be metered.

This does not embrace a plan of universal metering, but simply a continuation of past practices, with selective metering for those who willfully waste the water, and sufficient funds to supply the meters applied for under ordinary conditions.

Due to the fact that the system is not capable of meeting the maximum demands, there will be considerable work necessary in the first few years in order to catch up.

It will be necessary, starting in the year 1921, to borrow money in order to carry on this work. A loan for this purpose would have to be floated each year until 1928, by which time we would have borrowed approximately $15,000,000. In 1929 retirement of these loans could be started, until in 1935 all outstanding loans would be paid up, and a surplus acquired of approximately $3,000,000. From this time on, this surplus would continue to expand.

METERING AND WATER WASTE ELIMINATION.

Request was made in the 1920 budget for $200,000 to be expended in the elimination of water waste. If this amount is approved, it will be used to stop the underground leaks in the mains in districts where they are now known to exist. Leakage or willful waste when found on the consumer's premises would be eliminated by notifying the owner to correct the condition, and upon his failure to do so meter would be applied under authority of the city ordinance. This work would be carried on by districts, and the sections in which it is known that the most waste exists would be the first to receive attention.

Should this work show a saving, as it undoubtedly will, the program would be extended throughout the years to come until the entire system had been checked up and repaired and placed in good condition.

WATER FUND PROGRAM

From 1920 to 1950

Year	Ordinary	Rehabilitation	New Construction	Total	Revenue Including Salvage	
1920	$ 7,836,000	$ 2,425,100	$ 1,994,000	$ 11,755,100	$ 11,950,000	Expense includes nothing for Shops Revenue includes $2,000,000 from Sale of Lands
1921	7,420,020	1,314,300	3,185,000	11,919,820	8,700,000	Expense includes interest on loans
1922	7,774,716	1,000,000	2,980,000	11,754,716	9,050,000	Expense includes interest on loans
1923	8,187,392	776,300	4,325,000	13,288,692	9,400,000	Expense includes interest on loans
1924	8,365,006	750,000	4,178,000	13,293,006	9,750,000	Expense includes interest on loans
1925	8,508,147	762,000	2,475,000	11,745,147	10,100,000	Expense includes interest on loans
1926	8,577,784	826,800	1,663,600	11,068,184	10,450,000	Expense includes interest on loans
1927	8,586,463	826,800	1,312,800	10,726,063	10,800,000	Expense includes interest on loans
1928	8,603,586	826,800	1,865,000	11,295,386	11,150,000	Expense includes interest on loans
1929	8,595,216	826,800	1,625,000	11,047,016	11,500,000	Expense includes interest on balance—can start retiring loans from surplus
1930	8,534,826	826,800	1,006,000	10,367,626	11,850,000	Expense includes interest on loans
1931	8,435,718	826,800	600,000	9,862,518	12,200,000	Expense includes interest on loans
1932	8,315,158	826,800	660,000	9,801,958	12,550,000	Expense includes interest on loans
1933	8,214,246	826,800	1,030,000	10,071,046	12,900,000	Expense includes interest on loans
1934	8,057,444	826,800	550,000	9,434,244	13,250,000	Expense includes interest on loans
1935	8,028,500	826,800	....	8,855,300	13,600,000	All loans retired—surplus fund started
1936	8,065,400	826,800	....	8,892,200	13,950,000	
1937	8,105,500	826,800	....	8,932,300	14,300,000	
1938	8,140,700	826,800	....	8,967,500	14,650,000	
1939	8,158,200	826,800	....	8,985,000	15,000,000	
1940	8,171,600	826,800	665,000	9,663,400	15,350,000	
1941	8,251,200	500,000	500,000	9,251,200	15,650,000	
1942	8,315,500	500,000	500,000	9,315,500	15,950,000	
1943	8,401,300	500,000	500,000	9,401,300	16,250,000	
1944	8,472,800	500,000	500,000	9,472,800	16,550,000	
1945	8,546,500	500,000	940,000	9,986,500	16,850,000	
1946	8,617,000	500,000	1,300,000	10,417,000	17,150,000	
1947	8,694,400	500,000	1,155,000	10,349,400	17,450,000	
1948	8,759,000	500,000	500,000	9,759,000	17,750,000	
1949	8,841,600	500,000	500,000	9,841,600	18,050,000	
1950	8,907,000	500,000	500,000	9,907,000	18,350,000	Estimated surplus $103,022,978
Totals...	$257,987,922	$24,429,700	$37,009,400	$319,427,022	$422,450,000	

NOTE: Revenue estimated to increase at an average rate of $350,000 per annum until 1940 with City 60 per cent metered and at $300,000 until 1950.
Prepared by Bureau of Engineering, Department of Public Works, Feb. 7th, 1920.
All figures based on data supplied by:
Roy S. Spalding, Assistant Engineer, Water Pipe Extension Division;
J. J. Versluis, Engineer of Water Works Construction, Construction Division;
M. B. Reynolds, Engineer of Water Works Design, Designing Division;
Frank J. McDonough, Assistant Mechanical Engineer, Operating Division;
Stuart Combs, Engineer of Pumping Station Efficiency, Operating Division;
F. B. Alt, Chief Clerk, Accounting Division;
W. J. McCourt, Superintendent of Water, Bureau of Water;
Col. H. A. Allen, Mechanical Engineer in Charge.

An amount for this work in the future is figured as a part of the Water Fund program.

If this work is carried on properly and meets with the degree of success contemplated for it, the average per capita consumption for Chicago will be gradually decreased, as stated before, from 240 gallons to approximately 160 gallons per capita in the future.

This work will also have an effect upon our building program, as, if we are successful in eliminating the major portion of this waste, it will tend to slightly cut down the maximum load per capita. This will in all probability postpone some of the steps contemplated in the building program to a later date.

ENLARGING PUMPING STATION DISTRICTS.

The question may arise as to the enlarging of some of the districts to areas other than those planned.

There are two answers to this question, viz., operation and service. Under subject "Service" it is a great deal more difficult to supply pressure to the consumer if the water must be delivered an excessive distance before it gets to him.

There are many elements of operation, construction and characteristics of the system that make it uneconomical to attempt to supply sufficient pressure at the outskirts of the district where the district is too large. For every mile added to a district approximately eleven feet more head must be carried at the pumping station, which means added cost of operation.

As an example, to show what this means to the annual operating cost, if a given district were supplied by a pumping station pumping 100 million gallons per day, the annual cost of operation would be A. If, however, that district were increased so that the water must be pumped one mile farther from the station without increasing the requirements upon the station the annual cost of operation would be A + $21,000 per year, or, in other words, $21,000 per year for pumping 100 million gallons per day one mile extra distance. This is an item that must be considered in planning a system if service and economy in operation to a practical extent are to be maintained.

COMPARISONS WITH OTHER CITIES.

The mistake has been made of comparing Chicago's water system, maximum and per capita demands, etc., with those of other cities. This cannot be done with any degree of fairness to the subject unless very careful analysis and comparisons are made. The characteristics and different elements that go to make up each city must be considered, as these vary just as greatly as do the characteristics of a human being.

Questionnaires were sent out some time ago to 28 of the largest cities in the United States, the answers to which brought out the fact that, while New York City has an average per capita consumption of 110 gallons per day, it is supplying 15.3 people from each tap, and Chicago, with 240 gallons per capita, is supply 9.5 people per tap. It is only natural that where the point of supply is made more handy to the consumer he will use more water.

In the city of Petrograd, Russia, when they had a population of two million inhabitants, there was one pumping station of 80 million gallons per day capacity. This meant that the majority of the people went to the public tap and carried the water into their homes in pails. When they wished a drink they used one glassful of water, or one basin full of water to wash with, while when you go to the faucet to get a drink several gallons will run away to furnish you that one glass of water, and to wash your hands you will turn on the faucet and let it run until you are through.

Therefore, the more modern and up-to-date a city is, naturally the more water it will use.

Another item is the industrial use of water, in which no two cities are alike. A large portion of Chicago's water goes to this use.

Climatic conditions and the people who make up the city also have their effect upon the load placed on the system.

Therefore, if you wish to arrive at a true figure on what the average consumption should be, don't try to make a comparison with a city that has altogether a different make-up, but investigate your own city and the conditions that control the demand. This has been done in conjunction with this study in Chicago, and a most careful analysis without prejudice will substantiate the figures set forth in this report.

REMARKS.

In the study and plan as outlined herein every effort has been put forth to combine efficiency, economical operation and upkeep, service and investment in a consistent manner, considering every element that it was possible to foresee and giving due weight to the same before a decision was arrived at.

The different steps in the program are placed in a sequence that would best serve the requirements as foreseen.

Each element was criticized and viewed from all sides, and a decision was arrived at without prejudice to any part, but based solely upon intelligent judgment and foresight and the practices of good engineering.

The plan as outlined in the first few years of the program must be carried out as set forth in order to give service to the consumer and relieve the dangerous conditions that now exist.

The plan as a whole is submitted not as an ironbound program that must be followed out, but as a guide that may be followed in total or in part, with such alterations as may be foreseen from time to time, so that the system from this time on may be planned and built in a practical and intelligent manner, with a view to one co-ordinated. flexible system in the entire city of Chicago and the several districts bordering on its margins.

Yours very truly,

P. S. COMBS,
City Engineer.

DIVISION OF CONTRACTS

CHARLES F. HEALEY

Engineer of Contracts.

This Division, a new one, created in the early part of 1919, under authority of the City Council, became operative on March 15th.

All of the contracts and specifications for the Bureau of Engineering have been handled by the Engineer of Contracts, in addition to such contracts and specifications as were sent to the Bureau of Engineering by the Commissioner of Public Works from other Bureaus.

The total amount of contracts handled from March 15th to December 31st inclusive is shown in the following tabulation:

General Description	Number	Amount
Station Equipment	25	$ 99,400
Bridge Division	24	1,410,300
Coal	20	1,072,400
Council Orders	10	56,300
General Commodities	68	1,119,200
Services	4	46,150
Total	151	$3,803,750

In handling this amount of work, the records will show that in various items, such as valves, shut-off boxes, sand and gravel, storage coal, cranes purchased from the Emergency Fleet Corporation, the extension of the lumber contract and other items involving small amounts, the total saving by this Division in the nine and one-half months of its existence is approximately $98,500.

The saving effected in this Division, account of having one man handle all matters pertaining to contracts, instead of a man in each division, was considerable and amply justified the creation of the office.

The specifications as they are sent out have been considerably revised in line with a policy to make them less rigid, allowing the city to take advantage of stock production by contracts and doing away with the necessity of contractors bidding on special material for which, eventually, the city was compelled to pay.

CONSTRUCTION DIVISION

JAMES J. VERSLUIS
Engineer of Water Works Construction

JOHN S. DEAN
Assistant Engineer of Water Works Construction

MARSHALL BOULEVARD MUNICIPAL PLANT.

The work done at the Marshall Boulevard Municipal Plant by the Construction Division during 1919 consisted of making minor additions to and changes in the building and equipment, the principal items being changes in foundry toilet facilities, machine shop heating and ventilating systems, fire and elevator doors in machine, foundry and pattern shops, placing additional pavement at the loading platform of meter shop, the installation of new equipment in the chemical laboratories and the construction of temporary brick testing laboratory.

Bridewell Power House.

Work done by the Construction Division consisted of the starting of changes in the turbine-driven generator units, alterations in steam piping, the installation of locomotive type air compressor and piping, the building of air ducts for cooling electric generators and the completion of ash-handling system, including elevator and storage bins.

The switch track to the power house was moved and extended to permit dumping ashes from the bins directly into cars.

Leaks in the utility tunnel leading to the Municipal Contagious Disease Hospital were repaired.

The total cost of all construction work at both the Municipal Plant and Bridewell Power House during 1919 amounted to $47,421.82.

* * *

The construction work at the Marshall Boulevard Municipal Plant and Bridewell Power House during 1919 was in local charge of Mr. William H. Dean, assistant engineer, until March 4th, when Mr. A. G. Anderson, assistant engineer, assumed charge.

CHICAGO AVENUE TUNNEL CONNECTION.

The proposed installation of two 40 million gallon centrifugal pumps at the Chicago Avenue Pumping Station necessitated an addition to the tunnel system, consisting of a 12-foot gate and screen shaft designated as shaft N, about 90 feet of 7-foot tunnel connecting shaft N with the 5-foot suction shafts in the new pump room, and a 7-foot tunnel connection between shaft N and old shaft D.

This work, which was started in 1918, was resumed February 17, 1919.

The work done during 1919 has consisted of increasing by 12 feet the depth of shaft N, placing the fish screen guides and 8-foot gate in shaft N, completing the 7-foot tunnel connection between shafts N and D, completing the 7-foot tunnel connection to suction shafts in new pump room, reinforcing brick lining of shaft D by addition of a 12-inch concrete inner lining, reducing diameter of shaft from 10 to 8 feet, enlarging in shaft D the eye of 5-foot tunnel between shafts D and G to 7 feet, and installation at the enlarged eye of the gate formerly over 7-foot tunnel leading from shaft D to shaft C.

In order to accomplish the above work, it was necessary to isolate and unwater the sections of tunnels and the shafts affected by the operations.

This required the closing at the crib of gates of the two 7-foot tunnels from the Two Mile Crib, also closing of gates in shore shafts B and No. 1 of the Blue Island Avenue Tunnel.

By means of motor-driven pumps placed in shafts D, A and C, the water was removed and the tunnel and shaft changes made without difficulty.

In addition to closing the tunnel gates, brick bulkheads (4 feet thick) were built, one near shaft A in the 5-foot tunnel, connecting shafts A, B and C, and the other in the same tunnel at the east of junction with shaft C.

Shaft N was deepened 12 feet in order to obtain better ground for the 7-foot tunnel between shafts D and N.

The 5-foot tunnel eye in shaft D was enlarged to 7 feet in order to permit, at some future date, the enlargement to 7 feet of the 5-foot tunnel connection between shafts D and H.

The unwatering of the tunnel was started on June 7th and on July 30th the work had been completed, all construction equipment removed and tunnels again filled and in service.

The total cost of the work done during 1919, which was performed by city day labor, amounted to $37,140.38.

The work in connection with the construction of the Chicago Avenue Tunnel Connection was in local charge of Mr. E. P. Scott, assistant engineer.

WESTERN AVENUE TUNNEL.

The work contemplated consists of a 12-foot diameter concrete lined tunnel extending west from 73rd Street and State Street to 73rd Street and Western Avenue and from that point north to the site of the new William Hale Thompson Pumping Station.

The tunnel is to be driven through solid rock at a depth of about 150 feet below street level.

The tunnel is to be driven from two working shafts, one at 73rd and Wood Streets, designated as the Wood Street Shaft, and the other at 61st Street and Western Avenue, designated as the 61st Street Shaft.

The Wood Street Shaft will take care of the section of tunnel from 73rd Street and State Street to 73rd Street and Western Avenue; the 61st Street Shaft will be the working shaft for the section from 73rd Street and Western Avenue north to the site of the new station.

Wood Street Shaft.

This shaft is located at the southeast corner of 73rd and Wood Streets, the buildings for the plant being put upon vacant property belonging to the city, bounded by Wood Street, Hermitage Avenue, 73rd Street and 74th Street.

The work outlined for this section of the Western Avenue Tunnel includes the sinking of a 15-foot shaft to a depth of 150 feet below the street level.

Plant.

Construction work on the plant was started August 15, 1919, and was continued throughout the balance of the year.

The buildings comprise a machinery house, cement shed, office, stock room and work shop (the two latter being merged into one building) and a small portable steel house on the Hermitage Avenue side of the property, used for storing various tools and materials.

The machinery house is a two-story frame building, 105 feet by 31 feet, immediately south of the shaft, its long side fronting Wood Street.

A board fence, 7 feet high, has been put up to enclose the portion of the property set apart for the plant.

The erection of a headhouse over the site of the shaft was started August 27th. It is 50 feet 6 inches high, the four legs being 10 inches by 10 inches. Oregon fir 48 feet by 3 inches long, with a spread of 22 feet between centers at the bottom and 9 feet on top.

A timber trestle, 30 feet high and 16 feet wide on top, has been erected and extends from the headhouse to a point about 200 feet south of 73rd Street, near the center of the lot. It is to be used for the disposal of rock excavated from the tunnel.

Shaft.

Mayor Thompson formally broke ground for the new shaft on November 7, 1919.

Started excavation for the shaft on November 10th, completing the same to solid rock a distance of 43½ feet below the crown of the street pavement on November 24th. Diameter of excavation, 17 feet 4 inches.

The Ground Encountered was as Follows:

One foot of loam, 6 feet of yellow clay, 2.6 feet of mixed yellow and blue clay, 8 feet of medium stiff blue clay, 10 feet of stiff blue clay, 9 feet of hard blue clay, 2.5 feet of hard blue clay and small boulders, 3.7 feet of large boulders bedded in hardpan. Struck solid rock at elevation —18.8.

With the exception of a little seepage from the end of an old sewer broken off near the top of the shaft no water was encountered throughout the excavation of the shaft above solid rock.

Started the concrete lining for this portion of the shaft on November 25th, completing same in three days.

Both excavating and concreting were carried on during the day shift only.

As the 14-inch concrete lining progressed upward in the shaft, the 2-inch by 6-inch maple caisson lagging, the caisson rings and the nine-sided 10-inch by 10-inch timber rings put in for additional security were removed to elevation +12.8. Above this point the lagging and iron rings were left in place, as they were needed to keep the ground from caving in, it having been dug up on several occasions for the removal of sewer, gas and water mains which crossed the site of the excavation for the shaft. Within this lagging the concrete lining for the shaft is 12 inches thick.

The ground around the top of the shaft was covered with a bed of concrete to make the grade there a little higher than the street to keep out storm water.

Started excavation in rock on December 22nd and by December 31st elevation —72.8 had been reached.

The cost of the construction work done during the year 1919, which was performed by city day labor, amounted to $62,793.58.

The work at the Wood Street Shaft of the Western Avenue Tunnel was in local charge of Mr. E. P. Scott, assistant engineer.

61st Street Shaft.

The work contemplated at this location includes the sinking and lining with concrete of a 15-foot shaft at the northeast corner of 61st Street and Western Avenue.

Construction work was started on December 1st, and the work done during 1919 has consisted of building the foundations for office and blacksmith shop and the ordering and storing of practically all lumber and concrete material necessary for construction of all the buildings.

* * *

The construction work at the 61st Street Shaft of the Western Avenue Tunnel was in local charge of Mr. Paul Lippert, assistant engineer.

The cost of the work done during 1919, which was performed by city day labor, amounted to $8,135.47.

WILSON AVENUE CRIB.

Work in connection with the completion of this crib was resumed on June 2nd.

The principal work done during the season consisted of building the dock or landing platform. Construction of this dock had been previously attempted by the original contractor, but the work was destroyed by storm. This enhanced considerably the difficulties of construction, the site of the work being littered with old concrete and wood piles which interfered greatly with driving new piling.

The dock as built consists of about 1,320 cubic yards of concrete encased in a shell of interlocking steel sheet piling. This is reinforced by wooden foundation piles and for construction purposes the steel sheeting was braced with timbering and cables. The timbering was removed after the concrete was brought to the water line, the cables remaining as reinforcing.

Concrete for this job was mixed in a one-yard mixer located on a scow. The mixer was fed from bins by gravity and discharged into a tower bucket. The tower bucket in turn discharged into a fixed hopper feeding a tremie pipe system. This system was built up on the timber bracing of the dock.

The dock was completed October 2nd, and it was then possible to proceed with the interior masonry work, which was difficult before because of lack of storage space and landing facilities.

During the remainder of the year the steel light and bell tower was erected, the steel in connection with the fish screens was finished, the concrete slab of the roof was poured, about one-fourth of the second floor of concrete was built, the steel work was painted and about 45 per cent of the interior brick work was completed. The permanent heating boiler is placed and temporary living quarters have been provided so that construction work can be continued during the winter months.

Expenditures for the year of 1919 amounted to $108,060.23.

* * *

The construction work at the Wilson Avenue Crib was in local charge of Mr. William H. Dean, assistant engineer, until March 4th, when Mr. A. G. Anderson, assistant engineer, assumed charge.

TWO MILE CRIB.

The breakwater of this crib, consisting of rock-filled timber cribbing is old and, because of the failure of parts of the under water timbering, was in danger of complete failure, with consequent damage to the crib itself.

Repairs of a temporary nature were made by reinforcing the cribbing and repairs to the decking. A complete new deck of 3-inch by 10-inch pine planking resting on 6-inch by 6-inch sills was laid on the east side of the crib.

The timbering used in repairs was all salvaged from the 68th Street crib breakwater.

The work done during the year was performed by city day labor and cost $5,044.99.

* * *

The work was in local charge of Mr. A. G. Anderson, assistant engineer.

68th STREET AND EDWARD F. DUNNE CRIBS.

The work done by the Construction Division in 1919 at the 68th Street and Edward F. Dunne Cribs consisted of repairs to breakwater of the 68th Street Crib and repairing parapet wall of the Edward F. Dunne Crib.

Breakwater, 68th Street Crib.

The old breakwater consisted of timber cribbing on wood piles with rubble stone fill, decked with 3-inch to 10-inch lumber, which had been destroyed by storms. A portion of decking on south side of crib had been previously replaced by a concrete slab.

The reconstruction consisted of replacing old decking with an 18-inch reinforced concrete slab arched from concrete side walls extending to elevation —1.0.

This work necessitated the removal of old decking, replacing top timbers of the old cribbing, handling of approximately 1,000 cu. yds. of rubble stone, placing 46.2 tons of reinforcing steel and 1,780 cu. yds. of concrete. An opening, 11 feet wide, extending to elevation —5.0, was provided in southwest section of breakwater to permit entrance of a small boat and also as an outlet for ice and surplus water from the lagoon. Work on this opening was stopped by bad weather.

Parapet Wall of Edward F. Dunne Crib.

The repairs to parapet wall consisted of cutting out concrete which had cracked and was disintegrating and replacing same with new concrete bonded in with dovetail joints. Practically all of the concrete stairs were cut out and replaced.

Total cost of work done during 1919, which was performed by city day labor, amounted to $42,261.43.

* * *

The work done at the 68th Street and Edward F. Dunne Cribs was in local charge of Mr. A. G. Anderson, assistant engineer.

NORTH MICHIGAN AVENUE WATER PIPE TUNNEL.

This tunnel, which provides a passage for a 24-inch water main under the Chicago River at North Michigan Avenue, is 6 feet in diamter with an 8-foot diameter shaft at each end. Both shafts and tunnel are brick lined. The elevation of top of tunnel eye is —48.79 at north shaft and —60.57 at south shaft.

Both shafts for this tunnel interfered with the construction of the new Michigan Boulevard bridge and in driving piling for the north abutment cofferdam of bridge a pile had been driven through the tunnel lining, causing the tunnel to be filled to a depth of several feet with soft clay.

The work done in 1919 by the Construction Division consisted of pumping out the tunnel, removing the clay, scraping and cleaning the 24-inch water main and altering the top of north shaft to clear the bridge construction work. The oak pile, which had penetrated the tunnel lining was cut off behind the face of the lining and the opening filled with concrete.

The cost of the work done during 1919 amounted to $4,618.68 and was performed by city day labor.

* * *

The construction work was in local charge of Mr. E. P. Scott, assistant engineer, until February 11th. The work after that date was in local charge of Mr. Paul Lippert, assistant engineer.

POLK STREET SHAFT.

The 8-foot shaft in Canal Street, immediately south of Polk Street, that was built and used as a working shaft during the construction of the Polk Street tunnel, was found to be directly under live tracks that will be used in connection with the new union passenger station.

The shaft served no useful purpose and, as it would be practically inaccessible, it was decided to abandon it.

The brick work was cut down from the original elevation of +21.0 to +4.0, a steel bulkhead was set in the eye of the 8-foot tunnel at elevation approximately —50.0, then an 8-inch tremie was lowered, the shaft filled with natural cement concrete to about six feet over the eye of the tunnel, and the remainder filled to the surface with sand.

The original scheme was to lower the shaft to correct grade and place a new cover on same, the charges for this work to be paid for by the Chicago Union Station Co.

The costs of placing new cover to grade was accordingly charged to the Chicago Union Station Co., and the remainder to the city, which have been distributed as follows:

Placing new cover at grade, charged to Chicago Union Station Co.	$ 377.12
Placing bulkhead, concreting and filling shaft, charged to city	1,734.39

* * *

The construction work at the Polk Street Shaft was in local charge of Mr. Paul Lippert, assistant engineer.

CENTRAL PARK AVENUE PUMPING STATION.

The construction of the boiler house, described in previous reports and which was started in 1915, was completed in 1919.

The work done during the year consisted of completing piping changes, raising sump pump turbine to boiler room floor level, plastering store room, painting all interior work in boiler room, covering steam piping, cleaning up grounds, etc.

The cost of work done during the year amounted to $11,082.14.

Work was started on an elevated switch track in yard east of station for use of locomotive crane in handling storage coal. The track is laid on timber trestle on concrete bents. The work is completed except for laying of steel rails.

The cost of this work to date is $8,846.96.

* * *

The work at the Central Park Avenue Pumping Station was in local charge of Mr. John S. Dean, assistant engineer, until August 8th, when Mr. Louis S. Knorr, acting assistant engineer, assumed charge.

22nd STREET PUMPING STATION.

A description of the construction work contemplated at this station was submitted in the report for the year 1918.

The work done by the Construction Division during the year 1919 has consisted of —

Removal of discharge piping of old pumps.
Removal of masonry to permit erection of new discharge piping.
Building of anchors and piers for new discharge piping.
Pumping out and cleaning out north wet well.
Setting strainers on bottoms of new pump suctions in wet wells.
Building new maple floor with yellow pine joists and sills over north wet well.
Concrete floor in north pump pit.
Installation of 18-inch air ducts in floor of north pump pit from each pump to south wall.
Removal of steam sump pumps in north and south pump pits.
Erection of four motor-driven centrifugal sump pumps, two in each pump pit, with automatic priming devices.
Erection of hand-operated crane in north pump pit at basement floor level.
Building concrete platform from crane runway to high-tension vaults.
Hauling away old stone, brick, concrete and rubbish.
Pumping out north and south pump pits and cleaning up after flood, Feb. 12, 1919.
Raising basement window sills for flood protection.
Grading off yard after flood damage.
Building door in north wall of engine room, with I-beam and column for traveling hoist for loading and unloading transformers.
Building brick surge well 30 inches above basement floor around wet wells.
Installation of two new controllers for centrifugal pumps.
Making of necessary switchboard changes and electrical connections for operation of new and old pumping units.
Drying out and testing motors damaged by water February 12th.
Installation of lighting system.
Moving back old transformers and installation of new bus bars.
Installation of lighting transformers and panels, heaters and Sanitary District feeders.

On February 12, 1919, both pump pits were flooded by a break in a 30-inch water main outside the station. Water nearly covered the motors on the four electrical pumping units, the two old ones, and the two new pumps about to be put in service. This necessitated drying out of motors and electrical equipment at considerable expense.

To avoid damage from future breaks the basement window sills on north and east sides of station were concreted up two feet above the ground outside, sewer manholes were raised two feet and two-foot concrete stile built in front of the outside door of bath house.

The new pumps were started in February, 1919, the west pump first pumping water on February 19th and the east one on February 25th. They were turned over to the Operating Division on February 27, 1919.

In order to take care of surge in wet wells a brick wall 30 inches high was built around the wet wells in basement.

To facilitate the loading and unloading of transformers on auto trucks a door was built in the north wall of the engine room and a chain hoist installed to travel on a beam through the top of the door.

The total cost of above work for 1919, exclusive of contract work, amounted to $36,857.30.

Contract Work.

The United Engineering Co.'s contract for pumping machinery is completed.

Henry Newgard & Co.'s contract for electrical connections has been completed.

The Sullivan Machinery Co.'s contract for air compressor was completed.

* * *

The construction work at the 22nd Street Pumping Station was in local charge of Mr. John S. Dean, assistant engineer, until August 8th, when Mr. F. A. Smith, assistant engineer, assumed charge.

LAKE VIEW PUMPING STATION.

Owing to the dangerous condition of the Sederholm boilers, for which the Boiler Inspection Department refused to issue a certificate for operation, the Nos. 4 and 5 boilers were cut up with an oxy-acetylene torch and removed and a new 650 H. P. Edge Moor water tube boiler, with Sanford Riley stoker, installed.

The work, which was started on August 27th, consisted not only of cutting up the boilers proper but also of removal of steel lagged brick settings, concrete ash pits, construction of new ash pit and boiler setting and considerable remodeling of steel floor framing, galleries and bunker columns. New breeching connection was made, new piping connections made, including Diamond soot blowers, and steam turbine-driven forced draft fan installed with suitable air ducts to air chamber under stoker.

The new boiler was placed in service on December 27th.

The cost of the above work, exclusive of cost of boiler, stoker and accessories, amounted to $25,270.39.

* * *

The construction work done at the Lake View Pumping Station was in local charge of Mr. L. S. Knorr, acting assistant engineer.

68th STREET PUMPING STATION.

Boiler Room.

The construction work involved in the raising of boilers Nos. 1, 2, 3 and 4, installation of feed water heaters, feed pumps and piping, started in 1918, was completed in 1919.

The work done in 1919 consisted of—

Removing old brick settings and stokers of boilers Nos. 3 and 4.
Raising boilers Nos. 3 and 4 a distance of three feet, with the necessary structural steel changes.
Installation of Continental chain grate stokers under Nos. 3 and 4 boilers, including rearrangement of stoker drive shafting.
Building of brick settings of Nos. 3 and 4 boilers and covering tops of Nos. 1, 2, 3 and 4 boilers with sheet steel.
New concrete floor in front of boilers.
Completion of piping connections to feed pumps, feed water heaters and boilers, including installation of feed water regulators.
Installing new stoker drives and rearranging stoker drive shafting for Nos. 5, 6 and 7 boilers.
Covering feed water heaters and all piping with non-conducting covering.
Building of spiral stairway up to gallery over boilers.

Engine Room.

On May 19, 1919, work was started on the installation of two new 40-million gallon electrically driven centrifugal pumps, with bank of six transformers, line room, switchboard, oil switch vaults, etc. It was necessary to install only one pump at a time on account of the capacity of the station. The south pump, No. 3, was installed and started pumping water on November 3, 1919. It was operated until December 7th. At that time pump was shut down, impeller removed, found to be in bad condition, and replaced with impeller from the other pump furnished for the north end of station. The No. 3 pump was started again December 12th and run continuously.

To take care of surge in the wet wells a reinforced concrete overflow with cross-sectional area of nine square feet was built from No. 3 wet well to the curb on Oglesby Avenue, discharging at elevation +9.0. A similar overflow was built at the corner of 68th Street and Yates Avenue from shaft No. 9. The tops of Nos. 1, 2 and 3 wet wells were raised five feet above engine room floor.

The installation of chlorine booth and chlorinating apparatus started in 1918 and was completed in 1919.

The installation of the new 40 million gallon pump included—

Removal of old tile and concrete floor, masonry piers and old concrete footings to permit construction of new pump foundations.

Removal of old suction piping from No. 3 well and rebuilding of well around suction strainer elbow.

Building of foundation for pump and motor and placing of new cement floor around unit after erection.

Necessary structural steel changes and placing of new reinforced concrete floor around No. 3 pump pit.

Hauling new pumps, motors, piping, etc., from Chicago Avenue Pumping Station.

Erection of new pump, motor, strainer and piping, with necessary concrete anchors and piers for discharge piping.

Installation of line room equipment, switchboard, control board transformers and all electrical connections required for No. 3 pump and necessary switchboard connections for future No. 4 pump.

Construction of line room of 12-inch hollow tile, plastered on both sides, with reinforced concrete roof.

Cutting new doorway between engine and boiler rooms to permit removal of transformers.

Construction of concrete oil switch vaults.

The cost of all work done during the year 1919 amounted to $94,347.67.

* * *

The construction work at the 68th Street Pumping Station was in local charge of Mr. John S. Dean, assistant engineer, until August 8th. Mr. F. A. Smith, assistant engineer, was then placed in charge and continued in this capacity until December 8th, when Mr. M. S. Ralls, acting assistant engineer, assumed charge.

SPRINGFIELD AVENUE PUMPING STATION.

The construction work at the Springfield Avenue Pumping Station consists of the practical reconstruction of the boiler house and equipment, including raising roof of boiler house, new boiler room basement and boiler foundations, three new 650 H. P. boilers complete with accessories, remodeling of coal-handling machinery, installation of new ash-handling machinery, feed water heaters, new power piping, etc.

The work done during 1919 has consisted of—

Removal of old Scotch Marine boilers and furnaces Nos. 3 to 8 inclusive.
Removal of old boiler breeching, piping and boiler foundations for the above boilers.
Excavating for and building new concrete sump in basement of boiler house.
Excavating for and building concrete foundations for new boilers Nos. 2 and 3, and basement underneath same.
Placing new reinforced concrete floors in boiler room.
Installation of new lighting system in boiler room.
Installation of new power piping.
Covering new breeching and new power piping with non-conducting covering.
Structural steel changes, such as new steel bunker columns, floor beams, galleries, etc.
Complete erection of new No. 2 boiler, stoker, etc., including brick boiler setting.
Installation of drainage system for boiler room floors.
Concrete lining for coal bunkers.
On January 3rd the new No. 1 boiler was placed in service.
On July 24th the new No. 2 boiler was placed in service.

The total cost of the work done during 1919, exclusive of contract work, amounted to $69,323.01.

Contract Work.

The Edge Moor Iron Co. has practically completed its contract for furnishing and erecting boilers and superheaters.

William A. Pope under a contract for furnishing and delivering power piping material is completed, except for a few closer pieces.

Stephens-Adamson Mfg. Co. completed its contract for furnishing and erecting ash-handling machinery.

Sanford-Riley Stoker Co., Ltd., has completed, except the testing, its work under a contract for stokers.

Ralph H. Simpson Co. completed contract for steel and glass partitions around fan engines.

* * *

The work at this station was in local charge of Mr. John S. Dean, assistant engineer, until August 8th, when Mr. Louis S. Knorr, acting assistant engineer, assumed charge.

CHICAGO AVENUE PUMPING STATION.

The work at this station includes the construction of a new building adjoining the present building on the east and facing on Pearson Street. This building addition will house new pump room and transformer room with basement for storage purposes underneath transformer room. In addition to this main building addition there will be several changes in the existing structure, such as remodeling old Holly boiler room into machine shop, steamfitters' shop, toilet room and storage rooms, the moving of old wagon scale and the building of new scale house and stone fence along Chicago Avenue frontage. The architecture of the new building will conform to the present building and construction will be of Joliet limestone for the same reason.

The equipment to be installed in the new building will consist of two 40 millon gallon electric-driven centrifugal pumps, with necessary electrical accessories, such as switchboard, transformers, etc.

The actual construction work was started on March 14, 1919, and the following work was carried out during the year:

Day Labor.

New foundation for wagon scale was built and wagon scale moved to new location.

The remodeling of interior of old Holly boiler room into shops, toilet rooms and storage rooms was started, the work done consisting of completion of machine shop and steamfitters' shop, tile partition for toilet room and roughing in plumbing for same, completion of storage rooms, cutting all new door and window openings, erection of new roof trusses, etc.

The machine shop equipment was moved and installed in new shop.

About 75 per cent of the new brick and concrete driveway was completed. Foundations for new fence along Chicago Avenue were completed.

Excavation for and placing of concrete for new pump pit and all building foundations were completed.

Two concrete suction shafts 5 feet in diameter were built, connecting with the new 7-foot diameter tunnel built in 1918.

The construction of new pump pit required the use of sheet steel piling. The site of the pit was first excavated to elevation +7.0 or the level of basement floor. Lackawanna steel piling was then driven by the pile driver with steam hammer, aided by a water jet enclosing the area to be excavated for pit. The pit was then excavated by means of a derrick and clam shell bucket, loading the excavated material directly into motor dump trucks. The bracing of the pit with 12-inch by 12-inch timbers was carried on as excavation progressed.

To keep the east wall of the old building from settling, due to the adjoining excavation, the wall was carried on jacks resting on concrete footing. The maximum settlement taken care of by the jacks was about an inch.

After the construction of the building foundation walls, the structural steel floor and gallery beams were erected and reinforced concrete floor placed in transformer room and for pump pit gallery.

The total cost of the above day labor work during 1919 amounted to $99,925.19.

No contract labor was used at the station during 1919. The only contract work was the furnishing of material.

* * *

The work at this station was in local charge of Mr. John S. Dean, assistant engineer, until August 8th. Mr. Paul Lippert, assistant engineer, then assumed charge and continued in that capacity until December 8th, when Mr. F. A. Smith, assistant engineer, assumed charge.

MAYFAIR PUMPING STATION.

This station was practically completed and turned over to the Operating Division during 1918.

The work done in 1919 has consisted of—

All of the grading and placing of black dirt on pumping station grounds.
The construction of concrete sidewalks and entrance steps.
Completion of interior painting.
Official boiler test was made and boiler plant accepted.

As a result of the completion of the Mayfair Pumping Station, the Jefferson Park Booster Station was no longer required. The building was dismantled and the machinery hauled to and stored in the Municipal Warehouse.

The cost of the construction work done during 1919, exclusive of contract work, amounted to $59,353.33.

* * *

The work at this station was in local charge of Mr. William H. Dean, assistant engineer, until March 4th, when Mr. F. C. Martini, assistant engineer, assumed charge.

REPAIR SECTION.

This section handled the repair work in connection with various city-owned properties, including new construction at the Roosevelt Road bridge and viaduct, Municipal Reduction Plant and at other locations.

A total of 3,773 jobs were completed during the year, at a cost of $1,794,-066.22, or an average cost of $475.50 for each job.

This total charge was made up of $971,262.67 for labor, $684,273.23 for material, $81,176.90 for rental of equipment, and $138,530.32 for operation charges to cover overhead expenses.

The rental charges for equipment were made for the use of steam tugs, pile drivers and other large equipment, the maintenance and operation costs of which were charged to overhead expense.

The charge for operation is a percentage of the labor and material actually used on each job, and is made to cover the cost of supervision, maintaining tools, equipment and the cost of office maintenance and operation.

Work Authorized by Appropriations.

This consisted of services rendered in connection with the improvement of various city properties on authority from the City Engineer.

The most important jobs were the remodeling of the Rogers Park Pumping Station for a bathing beach house, building concrete walks, curbs and retaining wall and rebuilding with large stone the Morgan Pier at 51st Street Beach, also extensive alterations at the 76th Street Beach. Owing to strikes which tied up the work of a contractor on the Michigan Avenue widening project, the Repair Section built a ramp on Michigan Avenue north of Randolph Street and pulled steel sheeting of cofferdam of the north abutment of the Michigan Avenue bridge. The maintenance of temporary pumping equipment and installation of a temporary sewerage booster station at 108th Street and Avenue F were also supervised by this section.

Division of Bridges.

The work done for this division consisted of making repairs to the city-owned bridges, and was made up of all classes of building work. All electrical and mechanical repairs to operating machinery and signal apparatus, carpentry work, structural iron repairs, painting, glazing and other miscellaneous work required for the maintenance of the bridges were handled by this section, all work being done as requisitioned by the Engineer of Bridges.

There was a total of 1,855 Bridge Division jobs during the year, at an average cost of $364.09 per job.

The most important jobs handled for this division consisted of redecking the Erie and Taylor Street bridges, completion of the east approach to the Monroe Street bridge, new work at Roosevelt Road bridge and viaduct and taking down the entire superstructure of the South Halsted Street Calumet River bridge and rebuilding with new decking and beam spans.

Bureau of City Hall.

Thirty-four jobs were handled for this bureau, consisting of painting and miscellaneous repairs at the City Hall. The average cost per job was $531.07.

Fire Department.

Eight jobs at two locations were handled for this department, at an average cost per job of $813.30. The largest single job consisted of remodeling the fire drill school at 720 Sebor Street.

Harbor and Subway Commission.

Work done for this commission consisted of making miscellaneous repairs at the Municipal Pier. The largest single jobs were the construction of elevator hatchway and building 1,462 lineal feet of curbing along dock northwest of pier. A total of 12 jobs were handled at a cost of $15,111.99, or an average cost of $1,250.99 per job.

Department of Gas and Electricity.

Nineteen jobs were handled for this department at an average cost of $181.35 per job.

Department of Health.

Steamfitting and miscellaneous carpentry work was handled for this department at an average cost of $87.33 per job.

Division of Pumping Station Operation.

The work done for this division consisted of all steamfitting, electrical work, brick work and work required in the maintenance of the city's pumping stations. A total of 685 jobs at 25 locations were handled at an average cost of $179.88 per job.

Bureau of Small Parks.

The work of this division was divided into miscellaneous building repairs and alterations at the parks, playgrounds and bathing beaches under the control of the bureau. The average cost per job was $578.76.

Division of Pipe Yards and Stores.

The garage at Pipe Yard A was constructed for this division and miscellaneous labor furnished. Twenty-nine jobs were handled at an average cost of $300.70 per job.

Police Department.

Four hundred and twenty-four jobs at forty locations were handled for this department at various police stations and other property under their control. Among the large items was the remodeling of the old 24th Precinct Station and the cleaning and painting of the 10th, 12th and 16th Precinct Police Stations. The average cost per job was $630.49.

Bureau of Sewers.

Screens and office doors were installed at the 5th District office at a cost of $27.16.

Bureau of Streets.

Carpentry was the principal work performed for this bureau. Eleven jobs were handled at an average cost of $25.66 per job.

Bureau of Waste Disposal.

The work done consisted of making repairs and alterations to the buildings at the Municipal Reduction Plant and moving by steam shovel over 1,000 cu. yds. of cinders at the Bridewell incinerator.

Alterations at the reduction plant included changes in mill house and No. 4 and 5 dryer buildings, rebuilding button conveyor in receiving room, remodeling old mill house for tankage storage, rebuilding furnace in No. 2 dryer building, building tile house on roof of old extraction plant, erecting steel and concrete floors in No. 4 and 5 dryer buildings, removing old stack from condenser tower and re-erecting stack from old mill building on new foundation at condenser tower, building fire wall in dryer building, lining two stacks at new boiler house, etc.

A total amount of $45,382.39 was expended during the year, or an average of $1,134.56 per job.

Division of Water Pipe Extension.

The laying of new water pipe and repairing damaged sidewalks and 120 feet of dock amounted to $24,099.99, at an average cost per job of $119.30. The dock at the Chicago Avenue loading station was removed and a new one built, including new rods to back log. This completed the west dock on the bank of the river along city property south of the Chicago Avenue bridge.

Division of Municipal Shops.

Services rendered to this division during the year totaled $4,128.98. A total of thirty-one jobs was completed at an average cost of $133.19 per job.

A new truck elevator is being installed in the west end of the machine shop and a covered bridge is to be constructed between the fourth floors of the warehouse and carpenter shop buildings.

Services for Other Sections.

Certain work for which the Repair Section is especially equipped was handled for other sections of the Construction Division during the year.

The work done was painting, fabricating steel, moving machinery, and performing steamfitting work in connection with the construction of the various pumping stations. The average cost per job was $424.58.

Bureau of Rivers and Harbors.

Repairs to harbor boats and electrical work were done for this bureau. Twenty jobs were handled at an average cost of $70.84 per job.

Testing Division.

The chemical room was painted for this division and the necessary material is on the ground in readiness to install brick testing furnace. Three jobs were handled at an average cost of $298.27 per job.

The Municipal Market.

Alterations done at this location amounted to $158.11, or an average cost of $79.05 per job.

Services for Outside Parties.

Services in the amount of $649.42 were rendered to outside parties during the year.

Contracts.

Twenty contracts were handled by the Repair Section at an average cost of $7,479.74.

SUMMARY OF COST OF WORK DONE
By Repair Section in 1919

Department, division or Bureau for which work was done	No. of jobs	Number of locations	Total 1919
Miscellaneous appropriations	41	15	$ 98,659.65
Division of Bridges	1855	142	1,121,986.33
Bureau of City Hall	34	2	18,156.55
Fire Department	8	1	6,511.44
Gas and Electric Department	19	19	3,445.60
Harbor and Subway Commission	12	1	15,111,99
Health Department	15	14	1,309,85
Division of Pumping Station operation	685	25	123,220,39
Bureau of Small Parks, etc	64	22	38,042,69
Division of Pipe Yards and Stores	29	5	8,518.44
Police Department	424	40	25,219.73
Bureau of Sewers	1	1	27.16
Bureau of Streets	11	11	1,326.23
Bureau of Waste Disposal	40	2	45,382.39
Water Pipe Extension Division	202	273	24,099.99
Municipal Shops Division	31	1	4,128.98
Other Construction Division Sections	252	25	106,191.02
Bureau of Rivers and Harbors	20	17	1,416.70
Water Meter Shops Division	1	1	9.15
Testing Division	3	1	894.83
Efficiency Engineers	1	1	4.76
Municipal Market	2	1	158.11
Outside Parties	3	3	649.42
Contracts	20	11	149,594.82
Totals	3773	633	$1,794,066.22

The work carried on by the Repair Section was in local charge of Mr. A. G. Anderson, assistant engineer, until March 4th, when Mr. Wm. H. Dean, assistant engineer, assumed charge.

TOTAL WORK DONE BY CONSTRUCTION DIVISION IN 1919.

Work billed	$2,632,435.50

INVENTORY JANUARY 1, 1920.

Inventory of Equipment	$360,601.56
Inventory of Stock	34,150.56

WATER PIPE EXTENSION DIVISION.

H. L. LUCAS, Superintendent.

The work of the Water Pipe Extension Division includes the maintenance, operation and extension of the distributing system of the Chicago Water Works. In addition to the mechanical work involved in the care of existing and the installation of new mains, hydrants and valves, this division also handles the engineering work, involving plans for the extension of the system, the inspection of new services, the tapping of water mains, the investigation of service complaints, the inspection for water waste, and takes care of all plumbing repairs for other city departments.

Due to the high cost of materials and labor during the past year, the extension of the system has not been as great as in pre-war years, although somewhat greater than in 1918. Further advances in wages paid to labor, both skilled and unskilled, during the season just passed, as well as advances in the costs of materials, have caused higher costs in our maintenance and construction work.

The maintenance work is performed by the district forces in charge of the various district foremen, the city being divided into eight maintenance districts. A construction organization is maintained for the laying of large mains and doing of all pipe-laying work where trenching machines can be used to advantage, while all other construction work is performed by the district forces in their respective districts.

Water mains are laid by contract where they are paid for by special assessments, this division furnishing the engineering and inspection work only.

MAINTENANCE OF DISTRIBUTION SYSTEM.

The cost of maintenance of the distribution system during the past year amounted to $623,892.39, which is an increase over 1918 of $75,783.83, due to the advances in labor and materials mentioned above. This is also shown in the increase in cost per mile from $192.15 in 1918 to $217.27 in 1919.

It has been the aim to use modern equipment in every way possible in connection with our maintenance work in order to reduce expenses. The districts are all equipped with motor trucks, which have been of advantage in increasing the effectiveness of our force in handling its work and it is our plan during the coming season to further equip the maintenance force with such apparatus as will aid in reducing the cost of this work.

During the year a new headquarters has been fitted up for the fourth district, but the second, third and sixth districts should be re-located and provided with suitable buildings, the present quarters being neither adequate, convenient, sanitary nor sightly.

A curve is included in this report showing the comparison of maintenance costs in various years since 1915.

EXTENSIONS OF SYSTEM.

The additions to the system during the year 1919 amounted to 254,689 feet or 48.14 miles of pipe of all sizes, 519 gate valves and 815 hydrants. The total amount of pipe in service at the close of the year amounted to 2,915.70 miles.

IMPORTANT CONSTRUCTION WORK.

A 24-inch main was laid in 87th Street from State Street to Holland Road to complete connection of feeder mains between these points, which was started in 1917.

Work was started during the latter part of the year on the Chicago Avenue Pumping Station discharge system. This is a very important piece of work, involving the replacement of all of the existing mains in the discharge system at this station. A discharge system was planned, consisting entirely of 48-inch mains laid out as a double header, with sufficient capacity to take care of the ultimate pumpage from this station, which will amount to 250,000,000 gallons daily.

Several systems of mains were laid in subdivisions in various parts of the city, the most extensive being one at Clearing lying south of 63rd Street and east of Central Avenue, one at 67th Street and Western Avenue and one at 87th and State Streets.

This report includes a list of all mains laid by city forces, showing the size, number of feet, total cost and average cost per foot for each job. A great deal of our pipe this year was laid by our construction gang, which uses trenching machines for excavating. This gang laid 54,177 feet of 8-inch pipe at a total cost of $99,024.24, or an average cost per foot of $1.83. This enables us to make an interesting comparison between the cost of machine work by city forces and the cost of contract work on the special assessment jobs. The contractors laid 38,842 feet of 8-inch pipe at a total cost of $89,875.68, or an average cost per foot of $2.31.

It is our aim to improve our equipment for laying pipe in order to reduce costs as much as possible and also on account of the difficulty in securing sufficient men to carry on the work. The following is a comparison between the costs of laying mains of various sizes, comparing certain hand jobs with machine jobs of like character:

Work done by	Location	Length	Excavating Cost
		36″	
Hand	Harper Ave.	6686 ft.	$2.58
Machine	Addison St.	177899 ft.	1.81
	Saving per foot, $.77		
		24″	
Hand	Argyle St.	1360 ft.	1.53
Machine	Lawrence-Kostner Ave.	7990 ft.	1.14 } Avg.
Machine	Montrose-Central Ave.	10688 ft.	1.16 } $1.15
	Saving per foot, $.38		
		48″	
Hand	67th St.	5483 ft.	3.85
Machine	Avondale Ave.	10730 ft.	2.32
	Saving per foot, $1.53		
		8″	
Hand		21283 ft.	2.38
Machine		54177 ft.	1.91
	Saving per foot, $.47		

The above figures are based on existing prices for hand and machine work at the time the work was done. At present wages for labor the saving would undoubtedly be greater.

At present all large ditches and many of the smaller ones are backfilled by contract. The contract price for large ditches averages fifteen cents per foot. It is estimated that by backfilling with the crane this work can be done by the city's forces for ten cents per foot and will be a saving of $5,000 on the feeder mains to be laid during 1920. The savings shown in the above table are conservative, as the jobs compared were done when the labor cost was considerably less than it is at present. Also, our recent experience indicates that it is going to be very difficult to get labor and it will be almost impossible to execute the amount of work we anticipate without using the machine.

MAINS LAID ON DEPOSIT AND REVENUE

During the year 1919 there were laid 41,088 feet or 7.78 miles of pipe, which was paid for by deposits made by the owners of the property benefited. Some of the largest jobs of this kind were the subdivisions mentioned in the previous section. In addition there was 34,996 feet or 6.62 miles of pipe laid on account of revenue where reports of the Water Assessor indicated that the property to be supplied would develop an annual revenue of at least six cents per lineal foot.

MAINS LAID BY CONTRACT.

Water mains laid by contract during the past year amounted to 58,896 feet or 11.15 miles. The total cost of this work was $130,838.94. Most of the mains laid were of 6-inch, 8-inch and 12-inch diameters and were paid for by special assessments levied against the property benefited. A table is included in this report showing the streets on which these mains were laid, the amount of pipe laid and the contract price on each job. Contracts for all of this work are let by the Board of Local Improvements. The engineering and inspection are handled by this division.

WORK DONE ON ACCOUNT OF PAVING.

As in previous years the mains, valves and hydrants in streets ready for paving were thoroughly tested and where necessary overhauled or removed so that when the street was paved we were certain that our underground equipment was in good order. The work of testing these mains and services for leakage is performed by an engineering party and is described more completely under the heading of "Engineering Work."

In addition to the rehabilitation of existing pipes new mains were laid in streets to be paved where no pipes already existed. 72,995 feet or 13.82 miles of pipe were laid for this reason during the past season.

ENGINEERING WORK.

The engineering section of the Water Pipe Extension Division has in charge the preparation of plans, estimates and orders for all work done by the division forces, the preparation of plans and specifications for contract work, the inspection of the installation of mains by contract, analysis of cost of construction and maintenance work, preparation of specifications for material contracts, the making of pitometer and flow tests on water mains, leakage tests, pressure surveys and the collection of other data bearing on the operation of the distributing system.

In order to prosecute this work in the most effective way the city is divided into three engineering districts, each in charge of a division engineer who has under his direction three field parties, one on construction work, one on feeder survey work and one on street improvement work.

The construction party in each division has for its work the setting of line and grade stakes for all work done in its division, including the work done by contract, the furnishing of engineering supervision on all such work, analysis of cost, and estimating of cost and preparing of plans for proposed work.

The feeder survey party in each division has charge of making flow tests on feeder mains, regulation and control of the supply to various outlying areas, the making of flow tests around pumping stations and the compiling of data showing conditions in our feeder mains.

A highly important piece of work was performed by the feeder survey parties in the three divisions during the past year in the completion of population curves by square mile areas covering the entire city, extending from 1890 up to the present time and projected into the future to 1940. These population curves were the basis of estimates of water consumption made for all of these areas in five-year periods up to 1940. In making up these estimates account was taken of transportation and railroad facilities, the probable occupancy of the territory was forecasted and estimates were made as to the probable consumption of water for manufacturing purposes by parks, railroads and for other uses in the various square mile areas. In order to make this study complete it was necessary to obtain the meter readings for various industries in all parts of the city, extending over a period of several years. These were tabulated and the results used in making the estimates. This work, which was completed during the past year, is the basis for the City Engineer's program for development of the water system.

The feeder survey party also had charge of the pressure records, daily charts being received from about 62 gauges located in various sections of the city in fire engine houses and other public buildings, the charts from which are mailed daily to the division engineers' offices.

The street improvement party is charged with the duty of making tests on all streets to be paved, together with making of recommendations for work to be done on those streets by our district forces and the testing and assisting in the location of leaks in conjunction with the district men. This work is of very great value to the department on account of the fact that a great deal of leakage is stopped due to the efforts of these parties, and the mains and services on the streets to be tested are left in first-class condition.

In addition to the above outline of the engineering work, I wish to call attention to some important things accomplished in each of the three engineering divisions.

North Division.

Plans and estimates, together with program of construction were prepared for the new discharge system at the Chicago Avenue Pumping Station. This required considerable detail study, as it was absolutely necessary that the station be kept in operation during the time of construction and that no more than one pump should be out of service at one time. The work on this improvement was started early in December.

A considerable amount of work was done in connection with the Augusta Street sewer, it being necessary to remove mains at street intersections and to cut off or disconnect service pipes along the line of this work.

In addition to the preparation of plans and estimates for special assessment mains, the construction party of the North Division prepared plans for the extension of mains to the Sauganash subdivision, located between Peterson and Kostner Avenues, and work was started on the laying of these pipes.

The feeder survey party of the North Division did some excellent work in connection with the relief of low pressure in Austin by the isolating of the Cicero Avenue main, thereby supplying this territory from the Mayfair Pumping Station. Careful tests by this party were required to work out the details of this plan and put it in operation. On account of these tests a recommendation has been made to lay a 24-inch main in Pine Street from Cicero Avenue to Madison Street, which will assist greatly in distributing the water through Austin and relieving the low pressure in this section.

Pressure conditions were found unsatisfactory in Edison Park during the hot weather last summer. Tests were made in this territory and it was found there was considerable friction loss due to the small size of the pipes supplying Edison Park and Park Ridge. A recommendation has been made to relieve this situation by laying certain mains which will afford another supply to this territory and not only relieve the low pressure but be a safeguard against the failure of the water supply.

Special pressure and flow tests were made to determine the cause of complaints from the Ridge Boulevard district in Rogers Park. It has been recommended on account of these tests that this area which is now supplied from the Lake View Pumping Station be taken care of by a high pressure line from the Mayfair Pumping Station in Foster Avenue and in the feeder main which is recommended to be laid in Western Avenue from Foster Avenue to Pratt Avenue. A request for an appropriation for this main has been included in the budget for 1920.

All regulated valves in the North Division were operated and sealed in their proper positions and pressure surveys made in each area to insure proper service. A complete report has been made on the closed and throttled valves.

In connection with street improvement work a large service leak was found in making test on LaVergne Avenue from Roscoe Street to Addison Street. This one leak, which was at the tap, was due to a broken solder connection and amounted to 46,300 gallons per day. The water had undermined the street in such a way as to make it dangerous to traffic. Another large leak was found at the intersection of Oakley Boulevard and Walton Street, where a 6-inch pipe was found to be broken where it rested on ledge of rock. The water escaping from this leak followed the pipe for a distance of about sixteen feet and made its way into a sewer manhole. No evidence of this leak was indicated on the surface of the street.

A main was placed on the Crawford Avenue bridge crossing the North Branch of the River between Argyle Street and Bryn Mawr Avenue, where a leakage of 74,800 gallons per day was indicated in the pipe lying on the river bed. This leakage was eliminated by the installation of the new pipe.

Central Division.

Construction work in the Central Division consisted mostly of supervision and inspection of the changes in water mains made in connection with the Michigan Avenue widening and Union Station projects. We have had cosiderable work to do at both of these locations and it has required a large part of the junior engineer's time to keep in touch with this work.

A special long hydrant was designed after suggestions made by the Central Division engineers for use on two-level streets in connection with the above mentioned projects. A hydrant of this type was built and tested out and several are now being installed on Michigan Avenue. This hydrant permits of the operation of the hydrant from the upper level, while the main valve is below the ground on the lower level and therefore keeps the hydrant safe from frost.

Feeder flow tests, consisting of 24-hour flow records, were made at forty-five different points and the results of tests tabulated.

Regulated valves were tested out and valve locks installed throughout the Central Division. Tests were made on areas under regulation to insure a proper supply.

Tests were made in District No. 253, which lies immediately west of the river and north of Kinzie street. In this area all of the shutoff boxes were adjusted and stopcocks put in operative condition. The leakage in the mains in this area was measured and amounted to 53,200 gallons per day. The minimum night consumption was found to be 859,000 gallons per day. Deducting the leakage from this latter figure and dividing by the population we have a minimum night consumption per capita of 400 gallons per day. From these figures it will be seen that this district shows a large amount of underground leakage as well as a heavy leakage or wastage in the premises. Recommendations have been made to cut off unused services in this area, and then an attempt will be made to stop all of the underground leakage and submit recommendations for the control or stopping of the leakage in the premises.

Another district, No. 270, which lies between Kinzie Street, Madison Street, Halsted Street and the River has been under test in this division, and while the tests are not completed indications are that there is a heavy leakage, probably in excess of 92,000 gallons per day per mile of pipe. In this district the minimum night consumption is also very high.

A test was made on Lawndale Avenue between 30th and 31st Streets, where the street car company reported their tracks settling in spots. By the use of aquaphones on the hydrants and valves, leakage was found within certain limits and finally located on four service pipes which were leaking at the taps, the total leakage amounting to 80,000 gallons per day, which was wasting into the sewer.

Much of the time of the feeder survey party in the Central Division was occupied during the last year following up pressure complaints, making pressure surveys, changing valve settings in control areas and manipulating the flow on account of the great shortage of water and the inability of the Central Park Avenue and Springfield Avenue stations to adequately supply their areas.

South Division.

There were many changes due to track elevation and sewer construction work in the South Division during the past year. The most extensive work on account of track elevation occurred at 95th Street and the Illinois Central Railroad tracks, where there is a very deep depression and where our mains had to be relaid for a considerable distance. This work was planned and supervised in an efficient manner by the South Division engineers.

The construction party also supervised the laying of a 24-inch main in 87th Street from State Street to Holland Road.

The feeder main work in this section included tests on the discharge mains at Roseland and 68th Street Pumping Stations at various times during the year, reports of which were prepared and forwarded to the City Engineer's office. In addition a test was made on the consumption of water in Hegewisch which indicated a per capita consumption of 443 gallons per day under an average pressure of 26 pounds.

A closed test was also made in Hyde Park in September which indicated per capita rates as follows: Average 182, minimum 122 and maximum 222 gallons per day. The night rate was 67 per cent of the average rate. These per capita rates indicate a small waste due to the fact that the buildings are modern and have good plumbing.

A test was made in a section of South Chicago between 87th Street and 92nd Street in January of last year, which indicated an average per capita rate of 226 gallons per day and a night rate of 207 gallons per day, the night rate being 92 per cent of the average, which indicates a bad condition similar to that existing in Hegewisch.

The feeder survey party in the South Division also made numerous short tests, checked friction losses and pressures in various mains and compiled other data which assisted greatly in the intelligent operation of the distribution system. A leakage test was made in 59th Street between Western Avenue and Rockwell Street, where an inspection of the street indicated considerable settlement of the pavement. Upon inspection water was observed flowing into the sewer manholes and a leakage test was made, showing that there was a loss of about 116,000 gallons per day. By using aquaphones on the curb cocks leaks were found on seven service pipes and also on one joint and one hydrant which totaled 112,000 gallons per day.

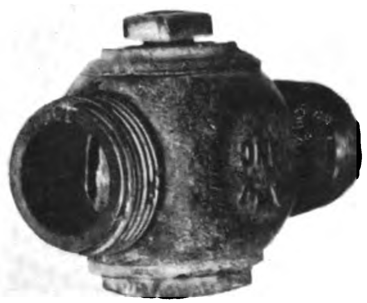
An interesting condition was found in Muskegon Avenue between 79th and 80th Streets, which is paved with asphalt and is in good condition. Several property owners in this block reported an annoying sound on their plumbing fixtures which kept them awake at night. By testing with the aquaphone and after installing patent plugs at intermediate points in this section, a point was finally reached by driving an iron bar through the pavement and listening with the aquaphone, where the sound from the leak was very intense. A one-inch service was uncovered by tunneling from in back of the curb, which showed a leak amounting to 109,000 gallons per day. A subsequent test on the main indicated that it was tight. A photograph is included herewith showing the character of various service pipe leaks found. An explanation of the photograph is as follows:

Figure 1 shows a 1-inch tap found on the 8-inch main in Kingston Avenue, 93 feet N. N. L. 93rd Street. There was no record of this tap on the official atlas. The tap was probably partly opened by one of the rocks dropped upon it when the ditch was backfilled, the action of the water increasing the size of the opening by scouring away the metal. The leak was at the rate of 9,240 gallons per day.

Figure 2 shows a piece of service pipe found in 59th Street 38 feet east of Rockwell Street. The leak at this point was at the rate of 35,000 gallons per day and on account of the fact that it was water-bound was scarcely audible with the aquaphone. The action of the water had washed away the upper half of the service pipe near the tap and had nearly closed the service pipe at a point about eight inches from the tap. This leak was caused by the faulty wiping of a joint.

Figure 3 shows a piece of service pipe that was cut off near the curb cock at No. 9203 Essex Avenue. The leak produced amounted to 51,134 gallons per day. Investigation showed that a 5-ton truck had gone over the buffalo box, driving the box downward, which sheared off the lead pipe through three-quarters of its circumference. A hole about two square inches in area in an adjacent house drain allowed the water to escape into the sewer without being noticed.

Figure 4 shows the section of pipe which was removed from a service pipe stub in Muskegon Avenue 15 feet N. N. L. of 80th Street. The wiped joint was not properly made and a leak of 109,440 gallons per day resulted. Since the main is in rock the water had easy access to the sewer.



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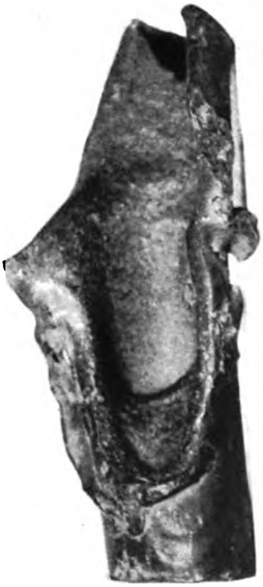

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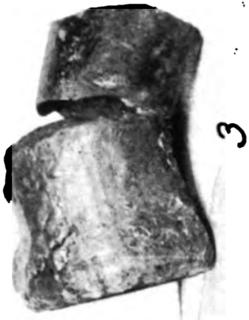

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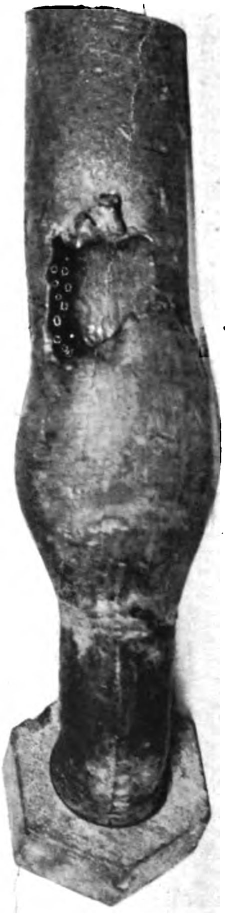

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Street Improvement Party.

The street improvement party in each division has made inspections and tests on the mains in streets to be paved. During the past year there were 42.86 miles of mains tested by these parties. The measured leakage in these mains amounted to 1,738,000 gallons per day. Of this amount 1,629,000 gallons per day was located and stopped. Included in this report is a table showing a summary of leakage tests by street improvement parties for four years, giving the amount of leakage measured and stopped and character of leaks found. During the four-year period 296 miles of mains have been tested in this manner and leakage amounting to 2,543,000 gallons per day actually stopped. The table indicates that the average leakage in the mains tested for the four-year period was at the rate of 19,390 gallons per day per mile of pipe.

SERVICE PIPES AND TAPS INSTALLED.

During the year there were 7,519 service pipes of all sizes from ¾ inch to 8 inches in diameter installed. 4,462 one-inch service pipes were installed by special assessment, the total cost being $75,394, or an average cost of $16.89 each. There were 190 tapping connections from 3 inches to 12 inches in diameter each. In making all taps 3 inches to 8 inches in diameter inclusive, the power tapping machine was used. This machine is equipped with an air motor which is driven by an air compressor from a 1½-ton motor truck. This makes the operation of making large taps on the mains very efficient and economical, although during the past two years this machine would have been able to do twice as much work as it was called upon to do, which would, of course, reduce the average cost per operation a great deal. The cost of installing taps ¾ inch to 2 inches in diameter is itemized in the following table and compared with the costs of the two previous years.

	1917	1918	1919
Tapper in charge	$ 1,400.13	$ 1,740.00	$ 2,149.00
Tappers' salaries	19,068.98	17,129.14	15,867.35
Team hire	8,541.00	501.00	....
Auto truck	7,584.00	9,980.00	14,102.60
Corporation ferrules and plugs	21,672.57	7,584.05	9,069.61
Miscellaneous items	220.49	229.69	813.34
Shop repairs	930.14	700.00	232.00
Combination drills and taps	678.60	388.75	....
Total expenses	$60,095.91	$38,252.63	$42,233.90
Taps installed, ¾" to 2"	18,420	4,850	8,347
Plugs installed, ¾" to 2" (brass)	372	361	48
Plugs installed, ½" (iron)	20	39	....
Total operations performed	18,812	5,250	8,395
Actual number of days worked	3,723	3,002	2,635
Average operation per man per day	5.05	1.75	3.18
Average cost per operation	$3.19	$7.28	$5.03

PLUMBING INSPECTION.

The work performed by the Plumbing Inspection section included the inspection of the installation of new service pipes, of existing pipes on streets to be paved, investigation of complaints, house-to-house inspections in certain areas, plumbing construction work for various city departments, and many special investigations. The following table shows the character of work performed, together with cost:

Character of Inspection	Number of Inspections	Cost
New service pipes (contract)	5598	$ 3,802.00
New service pipes (scattered)	1897	....
Retapping and reconnecting service pipes	374	3,150.00
Large service pipe applications	255	1,208.75
Large service pipe installations	184	1,117.75
Inspection of meter installations	6961	8,323.22
Fire and wrecked building inspections for cut-offs	1012	3,801.50
Inspection of services abandoned at main or roundway	1522	2,313.50
Inspection of recording pressure gauges	....	978.60
Inspection of drinking fountains and service hydrants	....	1,072.00
Inspection on account of paving	....	4,760.75
Inspection of shut-off boxes, account sidewalk construction	....	633.50
Inspection of cross connections	....	360.75
Inspection of complaints	....	11,388.45
House-to-house inspection	....	14,250.27
Plumbing installation	....	9,913.50
Total		$70,112.94

Inspection of 119 premises were made to locate cross connections between city water and pipes supplied from other sources, such as the river, wells or cisterns. Seventeen such connections were cut off as a result of this work.

There were 406 drinking fountains maintained and 41 moved to different locations during the year. Broken and not replaced fountains numbered 34; 11 fountains were removed by request, leaving 402 taken down in October, 1919. There were 43 watering troughs for horses in use during the year.

Inspections were made of all wrecked buildings and of all buildings partly or totally destroyed by fire, and service pipes were shut off or abandoned when they were not to be used immediately.

The work of making inspections of service pipes in streets to be paved is very important. Plats of these streets showing service pipes are furnished the inspector and he is required to check the records, make recommendations for cutting off unnecessary pipes, notify owners to increase size of pipes where found to be too small and make such other suggestions as will result in increased efficiency of this branch of the service. These reports are turned over to the division engineer and used in preparing orders for work to be done in these streets. 42¼ miles of streets were inspected in this way during 1919.

Where new sidewalks were about to be laid, the following work was done by the inspectors: 290 streets were inspected and 6,685 shut-off boxes were located. Of these, 406 were ordered raised by contractors and 176 were located and 72 repaired by the city. 6,031 were found O. K.

House-to-house inspections were made in all of wards 10 and 20 and part of wards 18 and 19.

16,359 buildings were inspected, in which were found 19,290 leaky fixtures resulting in a total measured leakage of 5,423,020 gallons daily. On reinspection, 11,828 of these were found repaired, effecting a daily saving of 5,403,517 gallons.

1,710 underground leaks and 2,782 hopper closets, which waste much water, were also found in these premises. No attempt was made to estimate the loss of water from these conditions.

Plumbing construction work was done for other departments at a total cost of $23,639.85, as follows:

Bridewell power plant	$ 77.78
Bureau of City Hall	1,730.33
Bureau of Engineering, Bridge Division	3,006.76
Bureau of Engineering, Construction Division	4,048.64
Bureau of Engineering, Municipal Shops	1,517.86
Bureau of Engineering, Meter Division	58.22
Bureau of Engineering, Pumping Stations	288.90
Bureau of Engineering, Testing Division	90.08
Bureau of Engineering, Water Pipe Extension	1,237.84
Department of Gas and Electricity	333.09
Department of Health	762.17
Bureau of Sewers	23.59
Bureau of Small Parks	832.80
Bureau of Streets	205.03
Department of Police	4,456.72
Fire Department	4.597.76
Municipal Market	3.41
Municipal Pier	325.90
United States Naval Forces	42.97
Total	$23,639.85

The following table shows the cause of complaints and the result of investigations by the Plumbing Section, but does not indicate the number of visits to the premises:

Cause of Complaint	Number
Faucets leaking	647
Frozen services inside premises	36
Frozen services outside premises	9
Fire hydrants leaking	15
Foul and dirty water	16
Fountains leaking	9
Hopper closets leaking and wasting water	636
Hose being used out of hours	27
Leaks underground, inside premises	1,224
Meters out of order	93
Miscellaneous complaints	166
No cause for complaint	92
Obstruction in services, within premises	59
Plumbing, faulty and leaking	146
Pressure, lack of, and poor	406
Pressure, poor, and tank system recommended	63
Riser pipes leaking	240
Roof tank out of order and overflowing	19
Service pipe leaking inside of premises	294
Service pipe leaking in street	28
Service pipe obstructed in street	176
Service pipe recommended for cut-off	50
Service pipes found too small	63
Shutoff rod out of order	47
Sewers obstructed and overflowing	102
Water closets leaking and wasting water	2,494
Water troughs leaking and wasting water	26
Water shut off for various reasons	189
Wrong locations	52
Total	7,424

WATER METER CONNECTIONS.

The following meter connections were installed on existing service pipes as required by ordinance:

Size	Number	Average Cost
¾ in.	178	$25.70
1 in.	1,127	22.14
1½ in.	960	22.20
2 in.	109	20.26
Total	2,374	

In addition the following meter connections were installed by plumbers on new service pipes, the material being furnished by the city:

Size	Number	Average Cost
¾ in.	14	$2.42
1 in.	51	3.34
1½ in.	45	6.08
2 in.	49	7.38
Total	159	

177 meter connections repaired at average cost of $18.22.

Number of inspections made during 1919	6,001
Number of vault notices served	331
Number of orders canceled after inspection was made	228

LOCATING GANG.

The following is a summary of the work performed during the year 1919 by the Locating Gang:

Number of service pipes located incident to street improvements	1,327
Number of iron service pipes located	31
Number of vacant lots examined prior to stubbing	3,030
Number of streets to be paved, examined	52
Number of special locations made	1,801
Number of street openings made	15
Number of openings inside curb	3,128
Number of buffalo boxes installed	265
Number of buffalo box lids put on	286
Number of buffalo box extensions put in	74
Number of buffalo boxes raised to grade	1,564
Number of buffalo boxes lowered to grade	1,286

RECAPITULATION OF MAINTENANCE EXPENDITURES BY PIPE DISTRICTS

Hydrants	1917	1918	1919
Repairing	$ 59,811.20	$ 52,003.36	$ 75,281.99
Oiling and packing	8,648.22	13,084.56	13,416.55
Inspecting and testing	22,934.97	24,214.20	28,220.63
Refilling basins and thawing	10,953.39	17,386.42	14,062.17
Repairing fire cisterns	414.99	78.21	423.62
Filling and emptying basins	16,738.40	....	....
	$119,501.17	$106,766.75	$131,404.96
Valves			
Repairing	$ 5,391.60	$ 4,886.89	$ 5,827.57
Replacing	1,033.24	546.74	410.11
Oiling and testing	3,845.96	5,460.72	9,507.94
	$ 10,270.80	$ 10,894.35	$ 15,745.62
Water Mains			
Repairing leaks	$ 76,194.54	$ 81,452.14	$ 95,631.02
Flushing mains	2,518.24	1,689.02	2,535.67
	$ 78.712.78	$ 83,141.16	$ 98,166.69
Service Pipes			
Repairing	$ 92,665.37	$ 87,533.59	$ 85,261.13
Shutting off abandoned taps	16,660.04	17,237.41	16,321.41
	$109,325.41	$104,771.00	$101,582.54
Other Maintenance Costs			
Watchmen and yardmen	$ 41,502.60	$ 39,544.56	$ 46,178.24
Locating leaks	17,287.73	21,394.25	26,654.02
Protecting system	2,469.50	1,355.28	3,312.05
Vacations	16,865.35	18,765.56	21,771.35
Monthly men, Sundays and holidays	11,422.96	12,153.11	15,601.57
Pay day, lost time	3,080.39	2,818.61	3,995.17
Sick and injured	809.60	1,148.33	542.18
Cleaning fountains	90.76	....	52.00
Hauling and loading	5,506.59	5,265.91	3,750.64
Work done, account sewer construction	17,428.89	13,520.36	5,288.16
Miscellaneous	6,986.91	10,778.62	9,956.40
Repairs, account electrolysis	6,143.78	....	5,448.09
Emergency gang	26,892.38	35,875.21	32,717.19
Expense, account suspension of work	5,651.42	....	....
	$162,138.86	$162,619.80	$175,267.06
Hydrants	119,501.17	106,766.75	131,404.96
Valves	10,270.80	10,894.34	15,745.62
Water mains	78,712.78	83,141.16	98,166.69
Service pipes	109,325.41	104,771.00	101,582.54
Other costs	162,138.86	162,619.80	175,267.06
Total cost, pipe districts	$479,949.02	$468,193.06	$522,166.87

RECAPITULATION OF MAINTENANCE EXPENDITURES, MASON DISTRICTS

Hydrant Basins	1917	1918	1919
Repairing	$ 5,589.89	$ 5,727.90	$ 4,416.20
Rebuilding	443.85	580.06	405.44
Draining	2,629.31	3,739.19	4,693.28
Grading	63.50	....	....
	$ 8,726.45	$ 10,047.15	$ 9,514.92
Valve Basins			
Repairing	$ 5,943.82	....	....
Rebuilding	205.62	$ 9,144.65	$ 6,537.78
Draining	202.97	258.16	349.22
Grading	1,979.15	3,166.26	3,726.42
	$ 8,331.56	$ 12,569.07	$ 10,613.42
Other Maintenance Costs			
Repairing cement walks	$ 4,021.57	$ 1,117.24	$ 3,092.82
Watchmen	1.50	....	....
Vacations	1,368.00	1,088.45	1,568.80
Miscellaneous	3,545.78	3,193.56	4,371.48
Setting new curbs and lids	....	....	2,504.52
Work, account sewer construction	186.10	....	....
	$ 9,122.95	$ 5,339.25	$ 11,537.62
Hydrant basins	8,726.45	10,047.15	9,514.92
Valve basins	8,331.56	12,569.07	10,613.42
Other costs	9,122.95	5,399.25	11,537.62
Total cost, mason districts	$ 26,180.96	$ 28,015.47	$ 31,665.96

RECAPITULATION OF MAINTENANCE EXPENDITURES

Work done by other than regular districts.

	1917	1918	1919
Repairing service pipes	$ 1,569.02	$ 14,450.06	$ 17,836.34
Repairing drinking fountains	4,727.80	5,055.40	4,468.80
General plumbing shop work	5,991.79	7,670.90	8,780.32
Flushing mains	2,649.00	....	....
Engineering work	704.25	7,779.78	10,970.65
Vacations	2,842.89	3,055.59	4,814.27
Miscellaneous work	4,804.22	7,948.97	16,993.63
Wiping tap couplings	425.25	....	....
Work done, account sewer construction	....	....	....
Testing hydrants	....	....	....
Testing valves	1,546.79	970.17	1,148.83
Expense, account suspension of work	595.01	....	....
Watchmen and yardmen	1,907.91	4,969.16	5,046.82
Total cost, other sections	$ 27,763.93	$ 51,900.03	$ 70,059.56

Summary

	1917	1918	1919
Pipe districts	$479,949.02	$468,193.06	$522,166.87
Mason districts	26,180.96	28,015.47	31,665.96
Other districts	27,763.93	51,900.03	70,059.56
Total cost	$533,893.91	$548,108.56	$623,892.39
Mileage of pipe	2757.72	2842.08	2871.57
Average cost per mile	$193.60	$192.15	$217.27

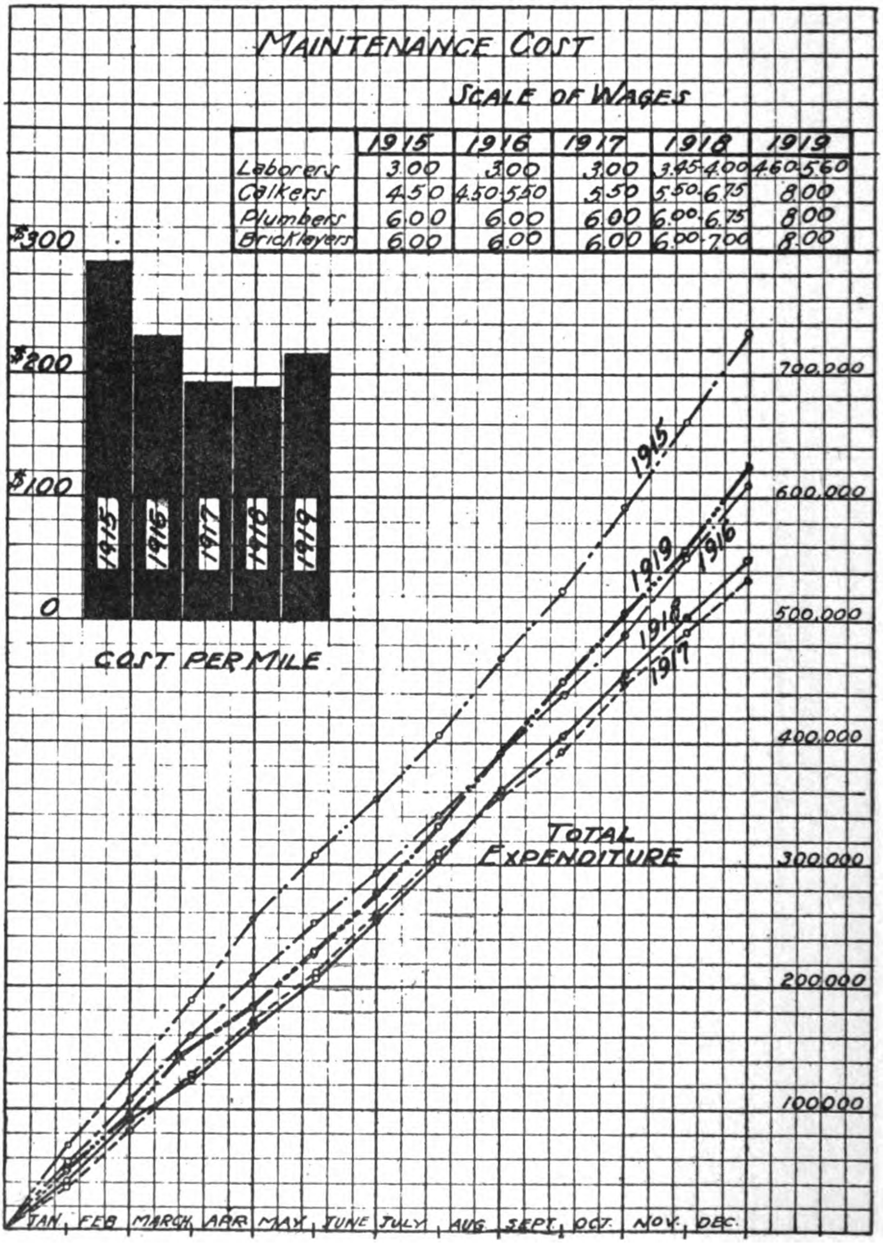
SUMMARY OF LEAKAGE TESTS

By Street Improvement Parties for Years 1916, 1917, 1918 and 1919

Division	Year	No. Jobs	No. Tests	Miles Pipe Tested	Leakage Measured G. P. D.	Leakage Stopped G. P. D.	Distribution of Leakage					Leakage per Mile of Pipe
							Joints	Br. Pipes	Service Pipes	Hydrants	Valves	
North Division	1916	100	165	30.97	274,588	213,525	23,441	....	168,512	21,054	518	8,869
	1917	171	230	36.20	424,090	364,700	83,900	24,800	215,900	40,100	....	11,715
	1918	115	169	30.81	268,600	259,300	110,400	....	92,600	56,300	....	8,721
	1919	69	104	15.4	518,600	477,500	27,200	376,000	67,200	7,100	....	33,680
Central Division	1916	83	116	10.60	†448,191	436,547	345,773	....	64,283	25,810	681	42,282
	1917	146	214	25.64	558,070	453,270	100,740	....	268,000	81,530	3,000	21,766
	1918	42	94	12.20	167,174	139,900	18,600	....	111,650	9,650	....	13,697
	1919	22	50	7.86	187,820	140,900	40,700	Δ40,000	30,600	29,600	....	23,900
South Division	1916	90	281	34.63	531,254	492,764	179,091	82,747	91,696	39,230	100,000	15,340
	1917	168	275	46.20	508,837	490,602	222,810	7,018	216,821	20,577	23,376	11,014
	1918	114	185	26.70	‡836,490	764,113	581,414	....	173,787	8,288	624	31,329
	1919	59	159	19.60	*1,031,698	1,010,630	328,390	....	604,109	74,711	3,420	52,638
Totals	1916	273	562	76.20	1,254,033	1,142,836	548,305	82,747	640,033	86,094	101,199	16,457
	1917	485	719	108.04	1,490,997	1,308,572	407,450	31,818	700,721	142,207	26,376	13,800
	1918	271	448	69.71	1,272,264	1,163,313	710,414	....	378,037	74,238	624	18,251
	1919	150	313	42.86	1,738,118	1,629,030	396,290	416,000	701,909	111,411	3,420	40,553
Grand Total for 4 years		1179	2042	296.81	5,755,412	5,243,751	2,062,459	530,565	2,420,700	413,950	131,619	19,390

†This item includes one joint leak of 200,000 gallons per day.
‡This item includes one joint leak of 536,000 gallons per day.

*This item includes 462,224 G. P. D. special tests.
ΔStopped by abandoning main.



MAINTENANCE COST

SCALE OF WAGES

	1915	1916	1917	1918	1919
Laborers	3.00	3.00	3.00	3.45-4.00	4.60-5.60
Calkers	4.50	4.50-5.50	5.50	5.50-6.75	8.00
Plumbers	6.00	6.00	6.00	6.00-6.75	8.00
Bricklayers	6.00	6.00	6.00	6.00-7.00	8.00

COST PER MILE

TOTAL EXPENDITURE

PIPE LAID BY SPECIAL ASSESSMENT

ON	LOCATION FROM	TO	CONTRACTOR	Size of Pipe	No. of Feet	Price per Foot	Valves and Basins	Hydrants	Cost
Ada St.	83rd St.	85th St.	Malachy Murphy	8"	1,388	$1.94	$ 225.00	$ 222.00	$3,139.72
Bennett Ave.	93rd St.	292' Southward	Simon Ryan	8"	350	3.94	75.00	80.00	1,534.00
Bishop St.	83rd St.	84th St.	DeVito & Till	8"	623	1.83	90.00	234.00	1,767.87
California Ave.	Lawrence Ave.	Ainslie St.	Simon Ryan	8"	748	1.98	75.00	80.00	1,793.36
Christiana Ave.	Foster Ave.	Carmen Ave.	Simon Ryan	8"	594	2.02	90.00	170.00	1,369.88
Crandon Ave.	81st St.	83rd St.	Scully Bros.	8"	1,255	1.88	150.00	320.00	2,829.40
84th St.	Hamlin Ave.	327' Westward	Malachy Murphy	8"	327	2.30	90.00	75.00	3,139.72
87th St.	State St.	South Park Ave.	Jas. J. Lynch	8"	2,620	1.85	360.00	255.00	5,462.00
Kilpatrick Ave.	51st St.	Archer Ave.	Malachy Murphy	8"	499	2.07	75.00	150.00	1,154.43
Kolin Ave.	54th St.	55th St.	Malachy Murphy	8"	649	2.00	75.00	150.00	1,523.00
Komensky Ave.	60th St.	61st St.	M. J. Bohan	8"	666	1.99	90.00	170.00	1,585.34
Laflin St.	120th St.	122nd St.	M. J. Bohan	8"	1,023	1.97	....	308.00	2,323.31
Lincoln St.	83rd St.	87th St.	Malachy Murphy	8"	2,625	1.93	300.00	518.00	5,884.25
Loomis St.	83rd St.	85th St.	M. J. Bohan	8"	1,385	1.90	255.00	240.00	3,126.50
McVicker Ave.	Grand Ave.	Armitage Ave.	M. J. Bohan	8"	1,470	1.88	80.00	375.00	3,380.90
105th St.	Wood St.	Prospect Ave.	M. J. Bohan	8"	1,418	2.15	180.00	340.00	3,568.70
109th St.	Loomis St.	Racine Ave.	M. J. Bohan	8"	1,343	2.15	180.00	340.00	3,454.46
111th St.	Laflin St.	Throop St.	Simon Ryan	6" 8"	1,501 1,533	2.43	560.00	480.00	8,575.43
Parnell Ave.	86th St.	87th St.	M. J. Bohan	8"	517	2.03	74.00	146.00	1,269.51
72nd Place	Hoyne Ave.	Leavitt St.	M. J. Bohan	8"	587	1.90	80.00	154.00	1,349.30
73rd St.	Hoyne Ave.	Leavitt St.	M. J. Bohan	8"	611	1.92	90.00	170.00	1,433.12
Throop St.	83rd St.	84th St.	Tiritilli & Till	8"	725	1.84	75.00	85.00	932.45
Wentworth Ave.	93rd St.	95th St.	M. J. Bohan	8"	1,292	1.96	148.00	365.00	3,045.32
Wesley Ave.	Davol St.	Vincennes Ave.	M. J. Bohan	8"	802	2.23	85.00	237.00	2,110.46

——Systems——

ON	LOCATION FROM	TO	CONTRACTOR	Size of Pipe	No. of Feet	Price per Foot	Valves and Basins	Hydrants	Cost
Austin Ave.	Elston Ave.	Milwaukee Ave.		8"	1,062				
Mason Ave.	Elston Ave.	Ardmore Ave.		8"	969				
Ardmore Ave.	Milwaukee Ave.	Mason Ave.	Simon Ryan	8"	238	1.94	300.00	640.00	6,515.56
Milwaukee Ave.	Austin Ave.	Ardmore Ave.		6"	169				
Elston Ave.	Austin Ave.	Mason Ave.		6"	396				
Cornelia Ave.	Marmora Ave.	Menard Ave.		8"	620				
Eddy St.	Marmora Ave.	Menard Ave.	Simon Ryan	8"	620	1.89	170.00	480.00	4,473.24
Menard Ave.	Austin Ave.	Cornelia Ave.		8"	648				

PIPE LAID BY SPECIAL ASSESSMENT—Continued

STREET	LOCATION FROM	TO	CONTRACTOR	Size of Pipe	No. of Feet	Price per Foot	Valves and Basins	Hydrants	Cost
47th St.	Knox Ave.	Cicero Ave.	DeVito & Till	8"	976	$1.83	$ 162.00	$1,560.00	$24,032.04
Cicero Ave.	43rd St.	47th St.		8"	2,604				
Kilpatrick Ave.	43rd St.	47th St.		8"	2,602				
Keating Ave.	43rd St.	47th St.		8"	2,602				
Knox Ave.	43rd St.	47th St.		8"	2,604				
Hamlin Ave.	82nd St.	82nd Place	Malachy Murphy	8"	335	2.20	180.00	225.00	4,193.40
82nd St.	Hamlin Ave.	Central Park Ave.		8"	1,387				
84th St.	Hamlin Ave.	300' Westward		8"	327				
Milwaukee Ave.	Melvina Ave.	Peterson Ave.	Simon Ryan	6"	670	1.84	1,620.00	2,635.00	23,346.84
Milwaukee Ave.	Melvina Ave.	Peterson Ave.		8"	221				
Elston Ave.	Melvina Ave.	Peterson Ave.		6"	761				
Elston Ave.	Melvina Ave.	Peterson Ave.		8"	605				
Elston Ave.	Matson Ave.	Peterson Ave.		8"	867				
Melvina Ave.	Elston Ave.	Milwaukee Ave.		8"	90				
Indian Road	Matson Ave.	Mansfield Ave.		8"	795				
Miami Ave.	Elston Ave.	Austin Ave.		8"	625				
Miami Ave.	Marmora Ave.	Indian Road		8"	170				
Menard Ave.	Mansfield Ave.	Peterson Ave.		8"	756				
Marmora Ave.	Miami Ave.	Peterson Ave.		8"	732				
Matson Ave.	Elston Ave.	Indian Road		8"	1,364				
Austin Ave.	Matson Ave.	Peterson Ave.		8"	937				
Mason Ave.	Indian Road	Peterson Ave.		8"	1,094				
Mansfield Ave.	Indian Road	Peterson Ave.		8"	689				
Paxton Ave.	87th St.	407' Southward	M. J. Bohan	8"	407	3.25	90.00	180.00	2,681.50
87th St.	Luella Ave.	Paxton Ave		12"	332				
Prairie Ave.	75th St.	77th St.	M. J. Bohan	6"	1,288	1.675	400.00	300.00	5,843.93
Prairie Ave.	75th St.	77th St.		8"	1,285				
77th St.	Prairie Ave.	Calumet Ave.		8"	498				
			Total		58,896				$136,838.94

PIPE LAID IN FIRST DISTRICT

ON	LOCATION FROM	TO	CHARGE	Size	Feet	No. of Hydrants	No. of Valves	Cost Total	Cost Per Ft.
Canal St.	Taylor St.	Polk St.	Replacement	16"	875	..	3	$4,776.27	$5.46
Forquer St.	Clinton St.	Canal St.	Replacement	8"	845	1	2	1,198.75	3.47
Grand Ave., N. S.	St. Clair	Michigan Ave.	Paving	8"	373	..	2	8,376.86	7.80
Michigan Ave.	Crossing	Grand Ave.	Paving	8"	65	1	5		
Grand Ave., S. S.	Rush St.	Michigan Ave.	Paving	8"	277	..	1		
Grand Ave., S. S.	Rush St.	Michigan Ave.	Paving	12"	357	..	..		
Harrison St.	Chicago River	Westward	Replacement	24"	255	..	..	3,740.52	14.67
Jackson Blvd.	Clinton St.	Canal St.	Replacement	16"	481	..	..	4,305.87	8.93
Lake St.	Michigan Ave.	Westward	Paving	8"	151	1	1	1,175.76	7.79
Michigan Ave.	Lake St.	Randolph St.	Paving	12"	460	1	1	3,353.50	7.29
Michigan Ave.	Grand Ave.	Austin Ave.	Paving	8"	535	2	1	2,946.55	5.51
Michigan Ave.	So. Water St.	Lake St.	Paving	12"	397	1	1	3,484.77	8.14
Lake St.	Crossing	Michigan Ave.	Paving	8"	31	..	..		
Michigan Ave.	So. Water St.	River St.	Paving	12"	433	..	1	3,816.70	4.41
Michigan Ave.	So. Water St.	River St.	Paving	8"	433	..	1		
Monroe St.	Market St.	Westward	Replacement	6"	207	1	..	1,250.68	6.04
Randolph St.	Michigan Ave.	Beaubien Ct.	Paving	12"	210	..	1	6,798.11	6.49
Beaubien Ct.	Randolph St.	So. Water St.	Paving	12"	837	5	3		
So. Water St.	Michigan Ave.	Westward	Paving	8"	170	2	1	2,655.80	5.49
So. Water St.	Beaubien Ct.	Michigan Ave.	Paving	12"	203	..	2		
Michigan Ave.	Crossing	So. Water St.	Paving	8"	35	..	1		
Michigan Ave.	Crossing	So. Water St.	Paving	12"	76	..	2		
Washington St.	Canal St.	W. Water St.	Deposit	4"	190	..	1	721.72	3.80
Washington St.	Franklin St.	Market St.	Replacement	8"	199	..	2	2,814.48	7.07
Washington St.	Franklin St.	Market St.	Deposit	8"	199				
Wentworth Ave.	17th St.	18th St.	Fire Protection	8"	242	1	..	893.53	3.69
Alley N. of Sebor St. and W. of Desplaines St.			Paving	6"	141	3	1	704.70	5.00

Total pipe laid by District........ 8,177
Pipe laid for hydrant branches........ 370

Total pipe laid in District........ 8,547

PIPE LAID IN SECOND DISTRICT

ON	LOCATION FROM	TO	CHARGE	Size	Feet	No. of Hydrants	No. of Valves	Cost Total	Cost Per Ft.
Crawford Ave.	442' S. N. L. 33rd St.	Southward	Deposit	8"	969	1	..	$ 2,663.93	$2.75
Kies Place	Oakley Ave.	Eastward	Revenue	6"	137	..	..	307.29	2.24
Kildare Ave.	Fillmore St.	Southward	Revenue	8"	75	..	..	461.16	6.15
Rockwell St.	21st St.	21st Place	Circulation	8"	289	..	..	972.64	3.10
21st Place	Crossing	Rockwell St.	Circulation	6"	25	..	1		
Western Ave.	26th St.	31st St.	Fire Protection	12"	2,328	6	4	10,739.83	4.61

Total pipe laid by District........ 3,823
Pipe laid for hydrant branches........ 91

Total pipe laid in District........ 3,914

PIPE LAID IN THIRD DISTRICT

ON	LOCATION FROM	TO	CHARGE	Size	Feet	No. of Hydrants	No. of Valves	Cost Total	Cost Per Ft.
Cicero Ave.	47th St.	51st St.	Circulation	12"	2,708	..	2	$ 8,792.91	$3.25
40th St.	75' W. of Talman Ave.	Westward	Revenue	6"	48	..	..	123.41	2.57
45th St.	Western Ave.	Eastward	Deposit	8"	470	1	1	1,330.56	2.83
45th Place	Avers Ave.	Eastward	Revenue	6"	306	..	..	622.39	2.03
46th St.	Avers Ave.	Hamlin Ave.	Revenue	6"	296	..	..	558.10	1.89
49th St.	Racine Ave.	Loomis St.	Circulation	8"	1,264	..	4	3,783.36	2.99
Homan Ave.	37th Place	Northward	Deposit	8"	604	1	..	1,613.16	2.67
Western Ave.	Bross Ave.	216' N. N. L. Bross Ave.	Deposit	8"	300	2	1	3,378.80	7.45
Western Ave.	Crossing	I. & M. Canal	Deposit	4"	153	..	..		
	Total pipe laid by District				6,149				
	Pipe laid for hydrant branches				331				
					6,480				
	Pipe laid by Special Assessment			8"	11,388				
	Total pipe laid in District				17,868				

PIPE LAID IN FOURTH DISTRICT

ON	LOCATION FROM	TO	CHARGE	Size	Feet	No. of Hydrants	No. of Valves	Cost Total	Cost Per Ft.
Augusta St.	Kilpatrick Ave.	Eastward	Paving	8"	380	3	..	$ 1,112.05	$2.92
Belden Ave.	Keystone Ave.	Crawford Ave.	Revenue	6"	196	..	1	413.16	2.11
Belmont Ave.	Kostner Ave.	Kenneth Ave.	Revenue	6"	263	..	2	627.95	2.38
Bloomingdale Ave.	Merrimac Ave.	Mobile Ave.	Fire Protection	8"	376	2	1	2,066.18	2.26
Merrimac Ave.	Wabansia Ave.	Bloomingdale Ave.	Fire Protection	8"	537				
Cambridge Ave.	Diversey Pkwy.	Surf St.	Paving	8"	430	1	..	1,121.11	2.61
Crystal St.	350' E. of Pine Ave.	Long Ave.	Paving	8"	387	1	1	785.84	2.03
Diversey Ave.	Kilpatrick Ave.	Cicero Ave.	Revenue	8"	582	2	..	1,278.91	2.19
Drummond Place	Cicero Ave.	Lavergne Ave.	Revenue	8"	1,252	4	1	2,522.57	2.01
George St.	Lavergne Ave.	Westward	Revenue	8"	471	1	1	1,668.08	3.54
George St.	Nashville Ave.	Natoma Ave.	Revenue	8"	408	1	..	1,091.96	2.19
Natoma Ave.	390' N. of Diversey Av.	George St.	Fire Protection	8"	90	..			
George St.	Sayre Ave.	Eastward	Revenue	8"	318	1	1	894.83	2.81
George St.	Crawford Ave.	Kearsarge Ave.	Deposit	8"	1,202	4	1	2,227.91	1.85
Kammerling Ave.	340' E. of Pine Ave.	Long Ave.	Paving	8"	408	..	1	864.70	2.12
LaPorte Ave.	Armitage Ave.	Northward	Paving	8"	424	1	1	1,091.47	2.57
LaTrobe Ave.	Fullerton Ave.	Belden Ave.	Paving	8"	690	1	1	1,304.83	1.89
Lockwood Ave.	Bloomingdale Ave.	Northward	Revenue	8"	394	1	..	1,235.05	3.13
Major Ave.	Wabansia Ave.	Northward	Revenue	8"	366	1	..	942.68	2.57

PIPE LAID IN FOURTH DISTRICT—Continued

ON	LOCATION FROM	TO	CHARGE	Size	Feet	No. of Hydrants	No. of Valves	Cost Total	Cost Per Ft.
Mango Ave.	Fullerton Ave.	Northward	Paving	8"	324	1	1	$ 791.92	$2.44
Mansfield Ave.	Crossing	Dickens Ave.	Deposit	8"	52	..	1	201.12	3.80
Melvina Ave.	280′ N. of Schubert Av.	Northward	Revenue	8"	72	..	..	160.98	2.23
Menard Ave.	North Ave.	Wabansia Ave.	Revenue	8"	588	3	1	1,470.52	2.51
Montana Ave.	Lavergne Ave.	460′ W. of LeClaire Ave.	Deposit	8"	1,181	3	1	2,314.55	1.95
Nagle Ave.	Wellington St.	Diversey Ave.	Revenue	8"	1,332	4	1	3,612.09	2.14
Wellington St.	Narragansett Ave.	Nagle Ave.	Circulation	8"	360	..	..		
Neva Ave.	296′ N. of Schubert Av.	Northward	Revenue	8"	66	..	..	180.80	2.73
Newland Ave.	140′ N. of George St.	Wolfram St.	Fire Protection	8"	500	1	2	1,955.69	2.14
Wolfram St.	Newland Ave.	Westward	Fire Protection	8"	184	..	..		
George St.	Newland Ave.	Westward	Fire Protection	8"	224	1	..		
Oakdale Ave.	Lavergne Ave.	LeClaire Ave.	Revenue	8"	627	2	1	1,325.46	2.11
Palmer St.	Laramie Ave.	Lockwood Ave.	Paving	8"	642	..	1	1,028.09	1.60
Parker Ave.	Kilpatrick Ave.	Cicero Ave.	Revenue	8"	577	2	..	1,106.73	1.91
Parker Ave.	Kostner Ave.	Kenton Ave.	Fire Protection	8"	1,258	4	1	2,934.82	2.35
Parker Ave.	Cicero Ave.	Eastward	Revenue	6"	302	..	..	674.75	2.23
Parkside Ave.	North Ave.	Lemoyne Ave.	Revenue	8"	643	1	1	1,272.18	1.96
Potomac Ave.	Long Ave.	Central Ave.	Paving	8"	1,236	4	2	2,271.84	1.83
Tripp Ave.	Barry Ave.	Fletcher Ave.	Deposit	8"	1,093	3	1	2,039.77	1.86
Fletcher Ave.	Tripp Ave.	665′ Eastward							
Barry Ave.	Crossing	Tripp Ave.							
Waller Ave.	North Ave.	Lemoyne Ave.	Revenue	8"	643	1	1	1,454.77	2.26
Weed St.	Cherry St.	Northeastward	Deposit	8"	264	1	1	866.93	3.28
Wolfram St.	Cicero Ave.	Westward	Revenue	8"	234	..	..	471.35	1.71
			Circulation	8"	42				
Wolfram St.	Lavergne Ave.	Westward	Revenue	8"	471	1	1	1,253.66	2.66

	Feet
Total pipe laid by District	22,089
Pipe laid for hydrant branches	671
	22,760
Pipe laid by Special Assessment	1,470
Total pipe laid in District	24,230

PIPE LAID IN FIFTH DISTRICT

ON	LOCATION FROM	TO	CHARGE	Size	Feet	No. of Hydrants	No. of Valves	Cost Total	Cost Per Ft.
Clyde Ave	83rd St	So. Chicago Ave	Revenue	8"	252	1	1	$ 975.00	$2.22
			Circulation	8"	188				
Crandon Ave	84th St	85th St	Revenue	8"	666	2	1	1,442.56	2.16
84th Place	Stony Island Ave	Blackstone Ave	Revenue	8"	536	1	1	1,367.61	2.55
85th St	Stony Island Ave	Westward	Revenue	8"	480	1	1	1,039.47	2.17
Indiana Ave	75th St	76th St	Revenue	6"	625	1	1	1,277.57	2.04
Merrill Ave	400′ S. of 83rd St	So. Chicago Ave	Revenue	8"	227	..	1	661.42	1.89
			Circulation	8"	128				
Merrill Ave	79th St	81st St	Deposit	8"	1,264	4	2	2,639.22	2.09
Oglesby Ave	83rd St	84th St	Revenue	8"	600	2	1	1,245.08	2.07
Paxton Ave	83rd St	Southward	Revenue	8"	324	2	1	806.70	2.48
70th St	Eberhardt Ave	Eastward	Revenue	4"	160	..	..	209.07	1.30
72nd St	So. Shore Drive	71st St	Paving	6"	264	1	1	552.04	2.09
74th St	Crossing	Clyde Ave	Paving	8"	45	..	..	306.67	3.45
74th Place	Crossing	Clyde Ave	Paving	8"	44				
So. Park Ave	78th St	79th St	Revenue	8"	683	1	2	1,663.18	2.43
Stony Island Ave	536′N. of S.ChicagoAv.	Northward	Fire Protection	12"	24	1	..	215.11	8.96
Stony Island Ave	74th St	75th St	Revenue	6"	452	..	1	1,087.13	2.40
Stony Island Ave	85th St	85th Place	Revenue	8"	600	2	..	1,989.77	2.90
85th Place	Stony Island Ave	Westward	Circulation	8"	86	..			
Courtway opposite 74th Pl.	Phillips Ave	Westward	Revenue	4"	192	..	..	263.77	1.37
			—System—						
So. Park Ave., E. S.	79th St	87th St	Paving	12"	5,292	10	8	....	....
So. Park Ave., W. S.	79th St	87th St	Paving	6"	5,312	5	8	....	....
79th St	Crossing	So. Park Ave	Paving	8"	119	..	..	....	....
81st St	Crossing	So. Park Ave	Paving	8"	119	..	1	27,728.12	2.50
85th St	Crossing	So. Park Ave	Paving	8"	119	..	1	....	....
83rd St	Crossing	So. Park Ave	Paving	12"	119	..	1	....	....
	Total pipe laid by District				18,920				
	Pipe laid for hydrant branches				367				
					19,287				
	Pipe laid by Special Assessment			6"	1,288				
				8"	5,658				
	Total pipe laid in District				26,233				

PIPE LAID IN SIXTH DISTRICT

ON	LOCATION FROM	TO	CHARGE	Size	Feet	No. of Hydrants	No. of Valves	Cost Total	Cost Per Ft.
Avenue "O"	134th St.	135th St.	Revenue	8"	624	3	1	$ 2,017.91	$2.18
135th St.	Avenue "O"	Avenue "N"	Circulation	8"	300				
Church St.	103rd St.	104th St.	Fire Protection	8"	782	1	1	1,712.85	2.34
Clyde Ave.	92nd St.	Northward	Revenue	8"	120	..	..	562.13	4.68
Corliss Ave.	Crossing	104th St.	Paving	6"	24	..	..	148.05	6.17
Cottage Grove Ave.	95th St.	Southward	Replacement	12"	336	2	..	2,561.80	7.62
Cottage Grove Ave.	95th St.	Burnside Ave.	Replacement	6"	232	..	1	6,082.38	9.54
Cottage Grove Ave.	95th St.	C. R. I. & P. RR.	Replacement	16"	405	..	1		
Davol St.	Wesley Ave.	115th St.	Revenue	8"	350	1		1,138.02	2.53
			Circulation	8"	95	..	..		
87th St.	State St.	Indiana Ave.	Deposit	6"	1,230	..	2	1,457.42	1.18
88th St.	Crossing	South Park Ave.	Paving	8"	228	..	..	967.69	4.25
89th St.	Crossing	South Park Ave.	Paving						
89th Place	Crossing	South Park Ave.	Paving						
90th St.	Crossing	South Park Ave.	Paving						
91st St.	Crossing	South Park Ave.	Paving						
South Park Ave.	Crossing	91st St.	Paving						
87th St.	Eggleston Ave.	State St.	Feeder Main	24"	2,996	2	1	15,797.61	5.30
Holland Road	87th St.	Southward	Paving	12"	84	..	2		
Emerald Ave.	127' S. of 90th St.	Southward	Fire Protection	8"	315	1	..	784.54	2.49
Essex Ave.	Crossing	South Chicago Ave.	Paving	8"	36	1	..	117.76	3.27
Holland Road	87th St.	Southward	Circulation	12"	291	..	1	1,391.13	4.78
Indiana Ave.	87th St.	89th St.	Deposit	8"	1,330	2	3	2,316.66	1.74
Jeffery Ave.	92nd St.	93rd St.	Paving	12"	542	1	1	16,266.59	3.88
Jeffery Ave.	87th St.	93rd St.	Paving	12"	3,361	5	6		
Jeffery Ave.	Crossing	87th St. N. S.	Paving	12"	72	..	..		
Jeffery Ave.	Crossing	87th St. S. S.	Paving	6"	72	..	..		
Jeffery Ave.	Crossing	89th St.	Paving	8"	72	..	..		
Jeffery Ave.	Crossing	91st St.	Paving	12"	72	..	..		
Lafayette Ave.	96th St.	390' N. of 95th St.	Revenue	8"	916	4	2	2,762.08	2.66
		95th St.	Circulation	8"	136				
Lowe Ave.	113th St.	115th St.	Deposit	8"	1,300	4	2	2,987.56	2.30
Michigan Ave. E. S.	87th St.	89th St.	Deposit	6"	1,275	5	4	4,065.44	1.60
Michigan Ave. W. S.	87th St.	89th St.	Deposit	8"	1,266				
95th St.	Indiana Ave.	Prairie Ave.	Circulation	6"	284	..	1	693.46	2.44
95th Place	Vincennes Ave.	Westward	Revenue	8"	345	..	..	1,216.66	3.53
92nd Place	Luella Ave.	Eastward	Circulation	6"	226	..	1	1,476.96	6.53
100th St.	Normal Ave.	Eastward	Revenue	8"	331	1	1	874.17	2.64
104th Place	Cottage Grove Ave.	Corliss Ave.	Revenue	8"	816	3	2	2,297.32	2.81
105th Place	Stephenson Ave.	Corliss Ave.	Paving	8"	908	2	2	2,598.83	2.86
107th St.	Glenroy Ave.	Throop St.	Circulation	8"	924	1	2	2,059.96	2.22
109th St.	Loomis St.	Westward	Circulation	8"	121	1	1	576.55	4.76
111th St.	Crossing	Laflin St.	Circulation	6"	48	..	1	471.87	4.91
Laflin St.	Crossing	111th St.	Circulation	8"	48	..	1		
Perry Ave.	120th St.	121st St.	Revenue	8"	625	2	..	1,635.99	2.53
			Circulation	8"	20				
Prairie Ave.	114th Place	118th St.	Replacement	8"	1,451	..	3	2,999.38	2.01
			Replacement	12"	42				

PIPE LAID IN SIXTH DISTRICT—Continued

ON	LOCATION FROM	TO	CHARGE	Size	Feet	No. of Hydrants	No. of Valves	Cost Total	Cost Per Ft.
Paxton Ave.	Crossing	92nd St.	Paving	8"	72	..	..	$ 473.68	$ 3.27
Merrill Ave.	Crossing	92nd St.	Paving	8"	72				
South Park Ave.	95th St.	99th St.	Paving	8"	2,628	3	3	6,201.21	2.29
South Park Ave.	Crossing	100th St.	Paving	6"	72	..	..		
South Park Ave.	Crossing	87th St.	Circulation	12"	36	..	1	369.43	10.26
Wabash Ave. E. S.	87th St.	89th St.	Deposit	6"	1,264	4	4	3,975.30	1.57
Wabash Ave. W. S	87th St.	89th St.	Deposit	8"	1,266				
Wabash Ave.	108th St.	Northward	Paving	6"	144	..	..	407.96	2.83
Wentworth Ave.	125th St.	Southward	Fire Protection	8"	576	1	..	1,271.83	2.21
Wentworth Ave.	Crossing	95th St.	Circulation	8"	26	..	1	422.02	16.23
Wesley Ave.	Crossing	Church St.	Paving	8"	60	5	1	212.95	3.56
Wood St.	158' S. of 97th St.	99th St.	Revenue	8"	1,008	1	2	2,058.92	1.65
			Circulation	8"	240				
Woodland Ave.	Wesley Ave.	Southward	Revenue	8"	144	..	..	329.07	2.28
Alley S. of 113th St.	Forest Ave.	Calumet Ave.	Circulation	8"	258	..	1	744.06	2.88

PIPE LAID IN SIXTH DISTRICT—Continued

ON	LOCATION FROM	TO	CHARGE	Size	Feet	No. of Hydrants	No. of Valves	Cost Total	Cost Per Ft.
			—System—						
116th St.	Crossing	Longwood Blvd.	Paving	8"	30	9	..	$736.70	$4.66
116th Place	Crossing	Longwood Blvd.	Paving	8"	30				
117th St.	Crossing	Longwood Blvd.	Paving	8"	38				
117th Place	Crossing	Longwood Blvd.	Paving	8"	30				
118th St.	Crossing	Longwood Blvd.	Paving	8"	30				
	Total pipe laid by District				33,025				
	Pipe laid for hydrant branches				774				
					33,799				
	Pipe laid by Special Assessment			6"	1,501				
				8"	8,168				
				12"	332				
	Total Pipe laid in District				43,800				

PIPE LAID IN SEVENTH DISTRICT

ON	LOCATION FROM	TO	CHARGE	Size	Feet	No. of Hydrants	No. of Valves	Cost Total	Cost Per Ft.
Albany Ave.	55th St.	57th St.	Paving	8"	1,224	3	1	$2,280.34	$1.86
Archer Ave.	Mobile Ave.	36' W.W.L. Merrimac Ave.	Circulation	6"	292	..	1	209.96	.72
Archer Ave.	Linder Ave.	Luna Ave.	Revenue	6"	323	..	2	1,281.14	3.96
Artesian Ave.	70th St.	71st St.	Deposit	8"	706	1	1	1,252.63	1.77
Artesian Ave.	41' N. of 69th St.	70th St.	Deposit	8"	641	2	1	1,200.50	1.87
Artesian Ave.	67th St.	68th St.	Deposit	8"	666	1	1	1,152.01	1.37
Bishop St.	59th St.	60th St.	Paving	8"	683	1	1	1,617.93	2.62
Campbell Ave.	70th St.	71st St.	Deposit	8"	707	1	1	1,216.70	1.87
Campbell Ave.	67th St.	200' S. of 68th St.	Deposit	8"	600	..	..	1,064.41	1.77
			Circulation	8"	266	2	1	473.82	
Campbell Ave.	69th St.	70th St.	Deposit	8"	641	2	1	1,198.13	1.86
Central Ave.	65th St.	63rd St.	Paving	12"	1,307	..	6	5,133.17	3.92
51st St.	Western Ave.	California Ave.	Paving	6"	2,561	..	..	7,594.21	2.75
Kedzie Ave.	Crossing	51st St.	Paving	12"	33	..	4		
Francisco Ave.	Crossing	51st St.	Paving	8"	46	..	5		
Sacramento Ave.	Crossing	51st St.	Paving	8"	47	..	1		
Albany Ave.	Crossing	51st St.	Paving	8"	48	..	..		
Rockwell St.	Crossing	51st St.	Paving	12"	23	..	..		
Hamlin Ave.	69th St.	71st St.	Circulation	8"	1,327	1	2	2,162.77	1.62
Kedzie Ave.	63rd Place	67th St.	Paving	6"	2,315	2	7	6,689.20	2.88
Lafayette Ave.	67th St.	69th St.	Paving	8"	1,318	4	1	6,089.63	4.62
Lockwood Ave.	55' S. of 52nd St.	51st St.	Revenue	8"	683	3	1	1,793.01	2.42
			Circulation	8"	55				
Lockwood Ave.	63rd St.	65th St.	Deposit	8"	1,303	5	2	2,536.97	1.94
Long Ave.	52nd St.	Northward	Revenue	8"	346	1	..	813.75	2.35
Long Ave.	63rd St.	65th St.	Deposit	8"	1,303	2	2	2,469.03	1.89
Lorel Ave.	63rd St.	65th St.	Deposit	8"	1,303	5	2	2,177.39	1.67
Maplewood Ave.	70th St.	71st St.	Deposit	8"	707	1	1	1,228.43	1.73
Maplewood Ave.	69th St.	70th St.	Deposit	8"	641	2	1	1,263.95	1.97
Maplewood Ave.	67th St.	68th St.	Deposit	8"	666	1	1	1,309.49	1.96
Marshfield Ave.	76th St.	Northward	Revenue	8"	320	1	..	785.69	2.45
Meade Ave.	52nd St.	207' S. of 53rd St.	Revenue	8"	867	2	1	2,851.44	3.28
Mobile Ave.	Archer Ave.	52nd St.	Revenue	8"	1,662	3	1	5,289.89	3.06
			Circulation	8"	62	..	..		
Moody Ave.	Archer Ave.	54th St.	Revenue	8"	192	..	2	771.25	1.46
Archer Ave.	Meade Ave.	Moody Ave.	Circulation	6"	333	..	1		
Moody Ave.	52nd St.	54th St.	Revenue	8"	875	2	1	2,081.47	1.58
			Circulation	8"	440				
Parkside Ave.	212' N. of 52nd St.	Northward	Revenue	8"	206	1	..	572.14	2.77
Richmond St.	63rd St.	67th St.	Paving	8"	2,592	8	3	4,800.83	1.85

PIPE LAID IN SEVENTH DISTRICT—Continued

LOCATION ON	FROM	TO	CHARGE	Size	Feet	No. of Hydrants	No. of Valves	Cost Total	Cost Per Ft.
Richmond St	56th St	57th St	Paving	8"	661	1	1	$1,087.72	$1.64
Sacramento Ave	63rd St	67th St	Paving	8"	2,592	6	2	4,161.08	1.61
Sacramento Ave	55th St	57th St	Paving	8"	1,292	3	2	2,428.29	1.87
63rd Place	272′ E. of Linder Ave	Long Ave	Deposit	8"	335	..	1	574.73	1.71
64th St	Central Ave	Long Ave	Deposit	8"	1,289	4	2	2,282.19	1.79
64th Place	Central Ave	Long Ave	Deposit	8"	1,289	4	2	2,338.63	1.82
65th St	385′ W. of Long Ave	Lockwood Ave	Deposit	8"	1,070	..	2	1,676.19	1.56
65th St	Western Ave	Irving Ave	Paving	8"	950	..	1	2,005.66	2.10
65th St	Irving Ave	181′ W.W.L. Hamilton Av.	Circulation	8"	435	..	1	994.85	2.28
65th St	Crossing	Irving Ave	Paving	8"	29	..	..	88.24	3.04
65th St	Sacramento Ave	Francisco Ave	Paving	8"	620	..	1	927.48	1.49
68th St	Sacramento Ave	152′ E. of Hamlin Ave	Revenue	8"	175	..	1	534.28	3.05
68th Place	Hamlin Ave	Eastward	Revenue	8"	206	..	1	568.84	2.75
70th Place	120′ W. of Wood St	Lawndale Ave	Deposit	8"	989	3	2	1,460.72	1.48
71st St		200′ E. of Lincoln Ave	Paving	8"	423	..	1	1,407.08	3.31
73rd St	Western Ave	Claremont Ave	Circulation	8"	372	..	1	1,331.80	3.53
73rd St	Ashland Ave	Lincoln St	Paving	12"	970	..	2	4,698.66	2.37
77th St	Ashland Ave	Ada St	Circulation	8"	1,751	..	3	2,949.48	1.68
77th St	Hermitage Ave	Robey St	Paving	8"	1,892	1	3	3,791.33	1.99
Talman Ave	415′ N. of 58th St	57th St	Revenue	8"	184	1	..	412.45	2.24
Talman Ave	210′ S. of 52nd St	53rd St	Deposit	8"	315	..	..	734.00	2.48
			Circulation	8"	141	1	1	396.21	
Whipple St	56th St	57th St	Paving	8"	659	1	1	1,320.11	2.01
Alley N. of Garfield Blvd	Hoyne Ave	Eastward	Revenue	8"	108	..	1	835.45	7.73
	Total pipe laid by District				50,077				
	Pipe laid for hydrant branches				971				
					51,048				
	Pipe laid by Special Assessment			8"	12,631				
	Total pipe laid in District				63,679				

PIPE LAID IN EIGHTH DISTRICT

ON	LOCATION FROM	TO	CHARGE	Size	Feet	No. of Hydrants	No. of Valves	Cost Total	Cost Per Ft.
Argyle St.	Whipple St.	Spaulding Ave.	Paving	8"	1,444	..	4	$ 3,199.92	$2.21
Avers Ave.	Argyle St.	Carmen Ave.	Revenue	8"	596	1	1	1,676.68	2.80
Berenice Ave.	300' W. of Long Ave.	Linder Ave.	Revenue	8"	309	1	..	729.37	2.35
Berteau Ave.	Linder Ave.	Long Ave.	Deposit	8"	656	2	1	1,128.79	1.71
Berteau Ave.	Linder Ave.	Central Ave.	Deposit	8"	669	1	..	1,124.93	1.68
Blaine Place	Washtenaw Ave.	Westward	Revenue	8"	270	..	1	629.45	2.32
Bryn Mawr Ave.	Crawford Ave.	Kostner Ave.	Circulation	12"	2,700	..	6	16,665.63	3.94
Kostner Ave.	Rogers Ave.	Bryn Mawr Ave.	Circulation	12"	1,400	..	..		
			Circulation	8"	100	5	2		
California Ave.	Crossing	Lawrence Ave.	Circulation	8"	24	..	..	81.53	3.40
California Ave.	Ainslie St.	Northward	Revenue	8"	300	1	..	623.77	2.08
California Ave.	Peterson Ave.	Devon Ave.	Paving	12"	2,596	3	12	9,733.53	3.33
				6"	288				
				8"	50				
Campbell Ave.	Devon Ave.	Granville Ave.	Revenue	8"	1,280	4	2	4,508.32	3.52
Carmen Ave.	Kedzie Ave.	Albany Ave.	Paving	8"	639	1	1	1,783.72	2.50
Troy St.	Crossing	Carmen Ave.	Paving	8"	36	..	..		
Albany St.	Crossing	Carmen Ave.	Paving	8"	36	..	..		
Carmen Ave.	Sawyer Ave.	Intersection	Revenue	8"	45	..	..	176.29	3.91
Carmen Ave.	Leavitt St.	210' E. of Oakley Ave.	Revenue	8"	416	1	1	912.82	2.19
Cicero Ave.	Wilson Ave.	Northward	Revenue	8"	263	..	1	577.98	2.19
Claremont Ave.	Granville Ave.	Devon Ave.	Paving	8"	1,272	4	2	2,608.91	2.05
Cornelia Ave.	Long Ave.	Eastward	Paving	8"	428	2	1	1,125.19	2.59
Crawford Ave.	Bryn Mawr Ave.	Northward	Circulation	8"	1,148	3	1	2,650.08	2.32
Crawford Ave.	19' S.N.L. Bridge Seat	166' N.N.L. Bridge Seat	Replacement	8"	185	..	2	2,523.98	7.80
Crawford Ave.	19' S.N.L. Bridge Seat	120' S.S.L. Bridge Seat	Replacement	8"	139	..	..		
Cullom Ave.	Linder Ave.	Long Ave.	Deposit	8"	675	2	1	1,113.58	1.64
Cullom Ave.	Linder Ave.	Central Ave.	Deposit	8"	727	1	1	1,334.18	1.83
Cullom Ave.	Lockwood Ave.	Long Ave.	Deposit	8"	603	..	..	1,228.91	2.01
Dakin St.	Crossing	Lockwood Ave.	Paving	8"	12	..	..	47.89	3.97
Drake Ave.	200' S. of Foster Ave.	Southward	Revenue	8"	100	1	..	309.70	3.09
Fairfield Ave.	Devon Ave.	Granville Ave.	Paving	8"	1,343	4	2	2,498.56	1.85
Fair Oaks Ave.	Broadway	Hazel Ave.	Paving	8"	637	2	1	1,572.56	2.48
Fairfield Ave.	Peterson Ave.	Granville Ave.	Paving	8"	1,240	3	2	2,234.93	1.79
Francisco Ave.	Crossing	Lawrence Ave.	Paving	8"	30	2	..	269.34	8.98
Giddings St.	385' W. of Major Ave.	Menard Ave.	Revenue	8"	100	..	..	582.84	2.70
			Fire Protection	8"	116	1	1		
Granville Ave.	Fairfield Ave.	California Ave.	Paving	8"	339	..	1	539.22	1.59
Granville Ave.	Irving Ave.	Leavitt St.	Deposit	8"	325	1	1	871.50	2.68
Harlem Ave.	Norwood Pk Ave.	Schreiber St.	Circulation	8"	622	..	1	1,837.02	2.82
Schreiber St.	Crossing	Harlem Ave.	Circulation	8"	12	..	1		
Isham Ave.	Crossing	Harlem Ave.	Circulation	6"	12	..	..		
Hermitage Ave.	Thorndale Ave.	Southward	Deposit	8"	271	..	..	533.40	1.97
Higgins Ave.	Mansfield Ave.	Austin Ave.	Paving	8"	1,284	3	2	3,095.68	2.41
Austin Ave.	Crossing	Higgins Ave.	Paving						
Menard Ave.	Crossing	Higgins Ave.	Paving						
Highland Ave.	Irving Ave.	Leavitt St.	Paving	8"	320	2	1	744.99	2.32
Huntington Ave.	Milwaukee Ave.	Southwestward	Revenue	8"	699	2	..	1,457.40	2.08
Hutchinson Ave.	Linder Ave.	Long Ave.	Deposit	8"	672	2	1	1,208.57	1.78

PIPE LAID IN EIGHTH DISTRICT—Continued

LOCATION ON	FROM	TO	CHARGE	Size	Feet	No. of Hydrants	No. of Valves	Cost Total	Cost Per Ft
Hutchinson Ave	Linder Ave	Central Ave	Deposit	8"	727	1	1	$1,175.22	$1.61
Hutchinson Ave	Lockwood Ave	Long Ave	Revenue	8"	606	2	1	1,657.94	2.72
Irving Ave	Granville Ave	Devon Ave	Paving	8"	1,272	2	2	2,257.03	1.77
Kelso Ave	30' N. of Kiona Ave	350' N. of Kiona Ave	Revenue	8"	347	1	..	768.97	2.20
Keystone Ave	Crossing	Argyle Ave	Paving	8"	29	..	..	140.49	4.82
Kildare Ave	Crossing	Leland Ave	Revenue	8"	24	..	..	891.62	2.19
Leland Ave	Crossing	Kildare Ave	Revenue	8"	100	..	..		
Kelso Ave	Leland Ave	Southward	Revenue	8"	282	..	1		
Kildare Ave	Parker Ave	Southward	Deposit	8"	57	..	..	235.50	2.35
Parker Ave	Crossing	Kildare Ave	Deposit	8"	43				
Kimball Ave	Addison St	Northward	Revenue	8"	289	..	1	750.18	2.60
Kostner Ave	Peterson Ave	Rogers Ave	Paving	12"	1,305	3	1	4,579.49	3.52
Lavergne Ave	Crossing	Addison St	Paving	8"	70	..	3	360.74	5.15
Lavergne Ave	Eddy St	Addison St	Paving	8"	267	..	2	1,144.07	4.26
Lawrence Ave	Central Ave	Austin Ave	Paving	12"	2,660	3	4	8,212.75	3.01
Menard Ave	Crossing	Lawrence Ave	Paving	8"	73	..	3		
Long Ave	Montrose ve	Berteau Ave	Circulation	8"	1,265	..	2	1,870.34	1.48
Mansfield Ave	Gettysburg Ave	Northward	Deposit	8"	425	1	1	952.24	2.25
Marmora Ave	Sunnyside Ave	123' S. of Wilson Ave	Deposit	8"	528	1	..	1,070.80	2.03
Marmora Ave	Sunnyside Ave	Montrose Ave	Deposit	8"	672	2	1	1,493.14	2.21
Maynard Ave	Peterson Ave	Elston Ave	Circulation	8"	186	..	..	391.26	2.11
Nordica Ave	Waveland Ave	Grace St	Revenue	8"	400	1	1	1,590.81	2.19
			Circulation	8"	324				
Normandy Ave	Addison St	Cornelia Ave	Revenue	8"	645	2	1	1,565.95	2.42
Norwood Pk. Ave	Niagara Ave	Harlem Ave	Replacement	12"	2,069	4	4	8,468.58	3.93
				8"	84				
Oakley Ave	Granville Ave	Devon Ave	Paving	8"	1,272	4	2	2,460.97	1.94
Parkside Ave	290' N. of Belle Plaine Av	Northward	Paving	8"	15	1	..	42.50	2.83
Pensacola Ave	Linder Ave	Central Ave	Deposit	8"	725	2	1	1,228.85	1.68
Pensacola Ave	Lockwood Ave	Long Ave	Deposit	8"	601	2	1	1,199.18	1.97
Pensacola Ave	Long Ave	Linder Ave	Deposit	8"	669	2	1	1,198.40	1.78
Peterson Ave	Forest Glen Ave	Kostner Ave	Paving	12"	1,535	1	3	5,686.41	3.70
Pingree Ave	290' N. of Chase Ave	Jarvis Ave	Revenue	8"	207	..	..	344.63	1.66
Roscoe St	Crossing	Keating Ave	Paving	8"	24	..	2	172.24	7.14
Rosemont Ave	Irving Ave	Leavitt St	Paving	8"	320	1	1	648.10	2.01
St. Louis Ave	814' S. of Foster Ave	Carmen Ave	Paving	8"	183	1	..	465.65	2.54
Thome Ave	Irving Ave	Leavitt St	Paving	8"	320	2	1	727.46	2.26
Whipple St	Argle St	Northward	Circulation	8"	233	1	1	689.15	2.94
Winona Ave	220' E. of Oakley Ave	165' W. of Leavitt St	Revenue	8"	215	..	1	528.94	2.44
Alley E. of Ridge Ave	Devon Ave	Northward	Revenue	8"	429	..	1	922.29	2.15
	Total pipe laid by district				49,025				
	Pipe laid for hydrant branches				953				
					50,978				
	Pipe laid by Special Assessment			6"	1,996				
				8"	14,444				
	Total pipe laid in District				66,418				

CORPORATION FERRULES INSTALLED

And large Connections made during the Year 1919

	¾ in.	1 in.	1½ in.	2 in.	3 in.	4 in.	6 in.	8 in.	12 in.	16 in.	Total
Scattering	1,552	16	78	102	52	58	41	14	....	....	1,913
Street Improvement by Special Assessment	4,462	....	....	....	....	....	....	....	....	....	4,462
Street Improvement by Private Contract	1,136	....	....	....	....	....	....	....	....	....	1,136
Retapping for replacing Mains	297	3	12	24	....	....	....	....	....	....	336
Retapping for repairing Services	28	5	2	3	....	....	....	....	....	....	38
Pitometer and Test Taps	....	566	....	....	....	....	....	....	....	....	566
Drinking Fountains	25	....	....	....	....	....	....	....	....	....	25
Service Hydrants	10	....	....	....	....	....	....	....	....	....	10
Miscellaneous	8	4	7	....	....	4	12	5	3	....	43
Council Order	3	....	1	3	....	1	....	....	....	....	8
Total	7,521	594	100	132	52	63	53	19	3	....	8,537

WATER SERVICE PIPES INSTALLED

During the Year 1919

	¾ in.	1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.	6 in.	8 in.	12 in.	Total
Installed at Cost of City*	....	3	....	1	3	....	1	....	....	....	8
Installed at cost of Owner	....	1,552	16	78	102	52	58	41	14	....	1,913
Installed by Private Contract	....	1,136	....	....	....	....	....	....	....	....	1,136
Installed by Special Assessment	....	4,462	....	....	....	....	....	....	....	....	4,462
Total	....	7,153	16	79	105	52	59	41	14	....	7,519

*Installed by Council Order for Religious and Charitable Institutions, Public Fountains, etc.

COMPLAINTS

Received by Water Pipe Extension Division during 1919

		DISTRICTS								Total
		1st	2nd	3rd	4th	5th	6th	7th	8th	
Leaks	Mains	484	247	738	234	151	382	129	394	2,759
	Service	204	443	269	626	182	284	269	561	2,838
	Hydrants	361	157	211	111	189	273	244	97	1,643
Hydrants out of order		81	49	31	51	18	47	23	38	338
Taps shut off	Abandoned	64	24	13	30	16	8	14	22	191
	Vacant	93	43	40	35	20	9	24	31	295
Miscellaneous		435	236	150	216	132	160	164	127	1,620
Valve basins repaired		2	......	......	......	......	......	1	2	5
Valve basin covers put on		11	4	......	1	......	1	2	2	21
Total		1,735	1,203	1,452	1,304	708	1,164	870	1,274	9,710

TOTAL NUMBER OF FIRE HYDRANTS

At close of 1919

DISTRICTS	2½-inch Single	2½-inch Double	3½-inch Double	4-inch Double	4½-inch Double	Total
First	336	1,481	....	926	109	2,852
Second	360	3,173	....	455	132	4,120
Third	165	2,207	16	532	269	3,189
Fourth	452	3,666	....	815	266	5,199
Fifth	178	1,714	....	680	174	2,746
Sixth	267	1,520	45	1,038	440	3,310
Seventh	234	3,082	....	1,162	578	5,056
Eighth	222	3,287	....	1,173	402	5,084
Totals	2,214	20,130	61	6,781	2,370	31,556

HYDRANTS PLACED IN 1919

Including those used to replace Hydrants of different size

DISTRICTS	2½-inch Single	2½-inch Double	4-inch Double	4½-inch Double	Total
First	1	5	10	39	55
Second	1	5	2	40	48
Third	....	2	1	68	71
Fourth	2	6	2	92	102
Fifth	....	1	1	56	58
Sixth	1	12	....	138	151
Seventh	....	3	2	153	158
Eighth	....	8	....	164	172
Totals	5	42	18	750	815

Total number of hydrants abandoned, 359.

TOTAL NUMBER AND SIZE OF VALVES

In use at close of 1919

DISTRICTS	4 in.	6 in.	8 in.	10 in.	12 in.	14 in.	16 in.	18 in.	20 in.	24 in.	30 in.	36 in.	42 in.	48 in.	Total
First	141	1,216	1,274	6	336	....	77	....	....	39	2	42	....	1	3,134
Second	100	1,968	1,140	3	234	....	51	....	....	26	5	41	1	....	3,569
Third	59	1,600	1,461	4	202	....	78	....	1	62	4	14	....	....	3,485
Fourth	97	2,453	1,694	....	457	....	50	....	....	65	9	33	1	....	4,859
Fifth	25	1,031	700	22	155	3	79	1	4	21	6	47	....	....	2.094
Sixth	20	1,315	1,006	....	252	23	46	....	....	49	7	31	1	....	2,750
Seventh	41	1,498	869	5	245	....	79	1	15	46	8	23	1	....	2,831
Eighth	48	1,924	1,745	....	369	....	34	....	16	52	7	30	....	....	4,225
Totals	531	13,005	9,889	40	2,250	26	494	2	36	360	48	261	4	1	26,947

STOP VALVES PUT IN DURING THE YEAR 1919

Including those used to replace Valves of different size

DISTRICTS	4-inch	6-inch	8-inch	12-inch	16-inch	24-inch		Total
First	1	9	14	13	4	1	....	42
Second	....	3	5	7	....	....	....	15
Third	1	7	24	2	....	....	....	34
Fourth	....	6	37	3	....	....	....	46
Fifth	....	14	26	10	....	....	....	50
Sixth	....	26	44	17	4	....	....	91
Seventh	....	14	92	9	1	....	....	116
Eighth	....	6	94	25	....	....	....	125
Totals	2	85	336	86	9	1	....	519

Total number of valves abandoned, 27.

PIPE LAID DURING 1919

Showing why it was laid

WHY LAID	DIAMETER OF PIPE IN INCHES						Totals
	4	6	8	12	16	24	
Paid 6 cents per foot revenue	352	2,948	31,696	....	....	....	34,996
Laid on Deposit	343	3,769	36,976	....	....	....	41,088
Laid by Special Assessment	....	4,785	53,779	332	....	....	58.896
Laid previous to paving	....	11,193	40,518	21,284	....	....	72,995
Laid to replace mains of smaller size	....	439	2,403	2,447	1,761	255	7,305
Laid for fire protection	....	....	5,150	2,352	....	....	7,502
Laid for circulation	....	1,220	13,288	9,795	....	....	24,303
Laid for feeder mains	....	....	....	....	....	2,996	2,996
Laid for hydrant branches	....	4,608	....	....	....	....	4,608
Totals	695	28,962	183,810	36,210	1,761	3,251	254,689

PIPE LAID DURING 1919
By Districts

DISTRICTS	DIAMETER OF PIPE IN INCHES						Totals
	4	6	8	12	16	24	
First	190	718	3,055	2,473	1,356	255	8,547
Second	....	253	1,333	2,328	....	....	3,914
Third	153	981	14,026	2,708	....	....	17,868
Fourth	....	1,432	22,798	....	....	....	24,230
Fifth	352	8,308	12,138	5,435	....	....	26,233
Sixth	....	7,146	28,085	5,168	405	2,996	43,800
Seventh	....	6,775	53,571	3,333	....	....	63,679
Eighth	....	3,349	48,804	14,265	....	....	66,418
Totals	695	28,962	183,810	36,210	1,761	3,251	254,689

RECAPITULATION OF MAINS IN SERVICE
At close of 1919, showing amounts by size in each District

Diam. of Pipes in Inches	DISTRICT NUMBER								Totals
	1	2	3	4	5	6	7	8	
3	1,444	....	....	....	....	....	....	....	1,444
4	98,415	83,842	37,320	81,981	642	6,967	11,189	31,980	352,336
6	547,565	1,050,094	758,780	1,159,504	587,745	755,543	836,935	1,107,613	6,803,779
8	392,002	568,979	470,184	888,641	411,957	566,230	901,636	1,018,721	5,218,350
10	4,644	5,950	3,170	....	16,020	....	428	10,245	40,457
12	122,535	143,785	86,113	257,764	108,546	164,112	205,388	229,279	1,317,522
14	....	....	5,280	....	60	....	23,275	....	28,615
16	47,864	51,505	65,740	52,830	54,579	61,852	52,044	13,860	400,274
18	....	....	....	....	....	....	840	....	840
20	....	3,277	....	....	3,685	....	20,955	28,219	56,136
24	56,865	55,500	80,224	85,194	61,823	72,963	74,343	73,146	560,058
30	5,520	11,000	16,340	21,045	18,488	4,823	14,593	18,540	110,349
36	77,515	43,860	52,780	57,009	82,343	39,032	48,592	59,506	460,637
42	....	....	....	1,200	....	....	....	6,984	8,184
48	2,910	....	....	....	11,327	10,051	....	11,646	35,934
Totals.	1,357,279	2,017,792	1,575,931	2,605,168	1,357,215	1,681,573	2,190,218	2,609,739	15,394,915

Mileage by District

First	257.06
Second	382.16
Third	298.47
Fourth	493.40
Fifth	257.05
Sixth	318.48
Seventh	414.81
Eighth	494.27
Totals	2,915.70

TABLE SHOWING AMOUNT OF WATER PIPE IN CITY OF CHICAGO
At close of 1919

Diameter in inches	Amount in use at end of 1918	Amount laid in feet in 1919	Amount taken up or abandoned	Grand Total, Feet	Grand Total, Miles
3	1,444	....	....	1,444	.27
4	355,600	695	3,959	352,336	66.73
6	6,785,804	28,962	10,987	6,803,799	1,288.60
8	5,039,026	183,810	4,486	5,218,350	988.33
10	40,457	....	....	40,457	7.66
12	1,282,819	36,210	1,507	1,317,522	249.53
14	28,615	....	....	28,615	.542
16	399,235	1,761	722	400,274	75.81
18	840	....	....	840	.16
20	56,136	....	....	56,136	10.63
24	556,819	3,251	12	560,058	106.07
30	110,349	....	....	110,349	20.89
36	460,637	....	....	460,637	87.24
42	8,184	....	....	8,184	1.55
48	35,934	....	....	35,934	6.81
Total in feet	15,161,899	254,689	21,673	15,394,915	....
Total in miles	2,871.57	48.14	4.01	....	2,915.70

SUMMARY OF STATISTICS
of the
CHICAGO WATER WORKS
For Year Ending December 31, 1919
In Form Recommended by the New England Water Works Association

GENERAL STATISTICS

Population by census, 1910—2,185,283.
Date of construction—1852.
By whom owned—City of Chicago.
Source of supply—Lake Michigan.
Made of supply—By gravity from intakes 2 to 4 miles out in Lake Michigan through tunnels to pumping station. Direct pumping mains.

STATISTICS OF CONSUMPTION OF WATER

Estimated total population to date	2,701,212
Estimated population supplied in Chicago	2,701,212

Total Consumption in 1919

	Gallons.
*Total net pumpage	260,774,620,000
Deduct water delivered through meter to communities outside of Chicago	3,815,970,000
	256,958,650,000
Passed through meters within city limits of Chicago	64,978,755,000
Percentage of consumption metered	25.3
Average daily consumption in Chicago, gallons	714,451,000
Gallons per day to each inhabitant	264
Gallons per day to each tap in use	2,270

* Does not include water pumped at booster stations.

SERVICES

Kind of pipe	Lead and cast iron
Sizes	¾, 1, 1¼, 1½, 2, 3, 4, 6, 8, 12 and 16 inches
Extended (new services installed)	7,519
*Total now in use	314,293
†Number of service taps added during year, ⅝ to 1 inch in diameter	7,549
Number of meters added during year	2,603
Revised list of meters now in use	27,532
Percentage of service pipes metered	8,90
Percentage of receipts from metered water	55.7

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* This figure represents the total number of accounts on the books, and closely approximates the number of working services.

†This includes taps for new service pipes, replacements and drinking fountains.

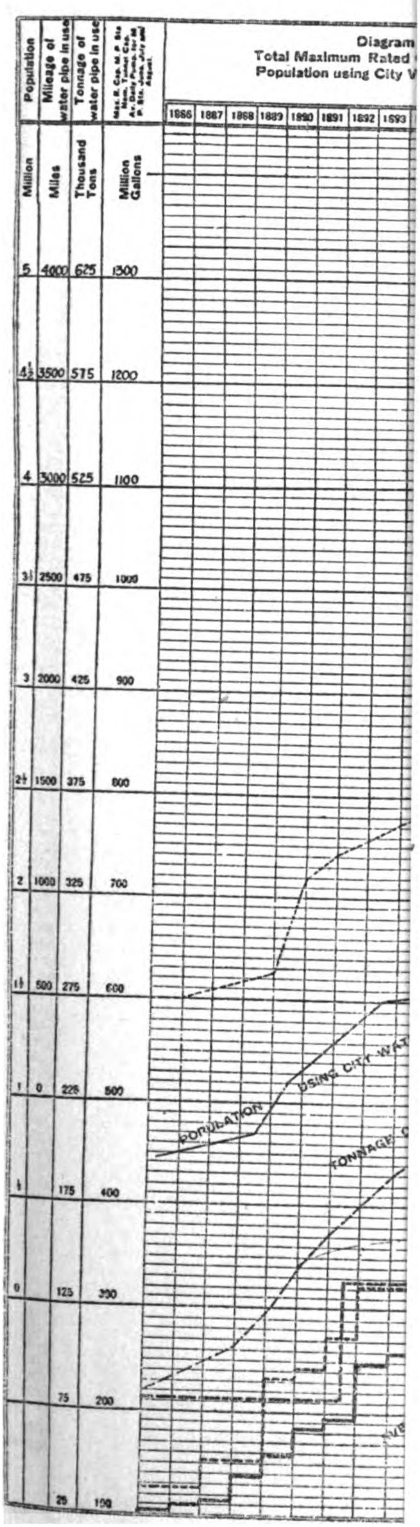

Diagram
Total Maximum Rated
Population using City W

..Cast iron
to 48 inches
.48.14 miles
..4.01 miles
,915.7 miles
..0.27 miles
........815
........359
......31,556
........519
.........27
......26,947
......None
15 to 60 lbs.

STATISTICS REGARDING DISTRIBUTION SYSTEM

Kind of pipe	Cast iron
Sizes	4 to 48 inches
Extended	48.14 miles
Discontinued	4.01 miles
Total now in use	2,915.7 miles
Length of less than 4 inches in diameter	0.27 miles
Number of hydrants added during year	815
Number of hydrants abandoned during year	359
Number of public hydrants now in use	31,556
Number of stop gates added during year	519
Number of stop gates abandoned during year	27
Number of stop gates now in use	26,947
Number of stop gates smaller than 4 inches	None
Range of pressure on distributing mains	15 to 60 lbs.

DIVISION OF OPERATION

PUMPING STATIONS AND LAKE CRIBS

F. J. McDONOUGH, *Assistant Mechanical Engineer*

The following is a list of Cribs and Pumping Stations in service during the year 1919:

CRIBS

Two-Mile Crib	Carl Jacobson, Keeper
Four-Mile Crib	John G. Bueckman, Keeper
C. H. Harrison Crib	Edward F. Warner, Keeper
Sixth-Eighth Street Crib	
E. F. Dunne Crib	Thomas Ward, Keeper
Lake View Crib	John W. Patterson, Keeper

WATER PUMPING STATIONS

Station	*Location*	*Engineer in Charge*
14th Street	1354 Indiana Avenue	Hugh Martin
68th Street	6801 Oglesby Avenue	Fred W. Sadler
22nd Street	2260 S. Ashland Avenue	James W. Beatty
Chicago Avenue	811 Lincoln Parkway	William J. Burns
Central Park Avenue	1015 S. Central Park Avenue	Frederick Gielow
Springfield Avenue	1747 N. Springfield Avenue	Philip Steele
Lake View	742 Montrose Avenue	Fred D. Parker
Harrison Street	735 W. Harrison Street	William Sullivan
Roseland	351 W. 104th Street	Thomas Kavanagh
Mayfair	4850 Wilson Avenue	Joseph O'Connell

SEWER PUMPING STATIONS

Station	*Location*	*Engineer in Charge*
Stony Island Avenue	7345 Stony Island Avenue	William Donlan
95th Street	9501 Baltimore Avenue	John M. Golden
Pullman	109th Place & Ill. Cent. R. R.	John T. Duffy
Kensington	11615 Indiana Avenue	Charles Naylor
Hegewisch	134th St. & Brainard Ave.	Thos. E. Maddux
Rogers Park	7207 Sheridan Road	Alfred C. Darst Louis Dewits

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WATER PUMPING STATIONS
Monthly Pumpage in Millions of Gallons—1919

Month	14th St.	68th St.	22nd St.	Chicago Avenue	Springfield Avenue	Central Park Avenue	Harrison Street	Lake View	Roseland	Mayfair	Total
January...	2,363.20	3,080.80	2,423.99	2,649.77	2,160.00	2,685.10	1,164.14	1,745.70	2,210.57	1,521.08	22,004.35
February..	2,117.00	3,015.28	1,578.00	2,316.95	1,768.12	2,449.70	945.70	1,497.70	1,931.40	1,385.38	19,005.23
March.....	2,347.00	3,304.50	2,198.85	2,401.40	1,855.20	2,510.12	1,052.00	1,626.30	2,007.45	1,527.70	20,830.52
April......	2,208.36	3,106.19	2,153.19	1,977.15	1,811.20	2,236.11	1,042.47	1,649.00	1,862.02	1,412.92	19,458.61
May	2,228.82	3,134.75	2,520.64	2,143.84	1,804.47	2,434.65	1,070.01	1,781.51	2,094.05	1,468.57	20,888.31
June......	2,208.68	3,376.05	2,575.28	2,051.58	1,817.86	2,479.07	1,074.76	1,811.70	2,331.78	1,770.92	21,497.68
July.......	2,281.11	3,745.15	2,896.31	2,157.52	2,120.37	2,580.67	1,047.39	2,082.10	2,632.90	1,870.70	23,414.22
August....	2,531.75	3,732.77	2,690.23	2,326.70	2,097.95	2,681.61	946.62	2,057.80	2,453.60	1,923.16	23,442.19
September.	2,452.38	3,658.26	2,624.73	2,451.65	1,967.84	2,721.12	1,022.67	1,975.20	2,267.21	1,846.02	22,987.08
October....	2,432.24	3,682.73	2,686.57	2,560.71	2,013.33	2,690.18	1,078.53	1,941.60	2,201.33	1,797.95	23,085.17
November.	2,085.36	3,636.93	2,592.85	2,542.52	1,755.08	2,117.57	978.12	1,789.90	1,979.05	1,719.69	21,197.07
December..	1,966.88	3,618.24	2,997.91	2,760.60	1,954.89	2,666.68	1,079.08	1,880.29	2,237.59	1,802.03	22,964.19
Total...	27,222.78	41,298.65	29,938.55	28,340.39	23,126.31	30,252.58	12,501.49	21,838.80	26,208.95	20,046.12	260,774.62

COAL ACCOUNT

CHICAGO AVENUE PUMPING STATION—YEAR 1919

	Tons	Price Per Ton	Cost	Tons Consumed
On Hand January 1, 1919	4494.006	$5.0664	$22768.44	
Received during:				
January	1342.625		7198.96	1889.2775
February	1037.865		5508.99	1599.3535
March	1223.225		6519.18	1959.269
April				1528.8785
May	815.520		3648.64	1220.6550
June	1208.530		5413.61	1638.4575
July	792.295		3540.77	944.525
August	1797.775		7849.09	1577.775
September	2460.585		11271.94	1370.725
October	3992.550		17762.85	1541.80
November	891.150		3995.92	1796.045
December				2045.40
Total received	15562.12	4.6722	72709.95	
Total available	20056.126	4.7606	95478.39	
Total consumed		4.7606	90984.58	19112.161
On hand December 31, 1919	943.965	4.7606	4493.81	

14th STREET PUMPING STATION—YEAR 1919

	Tons	Price Per Ton	Cost	Tons Consumed
On Hand January 1, 1919	3844.265	$5.0113	$19265.01	
Received during:				
January	1144.975		6109.93	2195
February	1679.975		8631.71	2020
March	2294.625		11977.26	2110
April	433.725		2263.91	1895
May	1020.025		4667.23	1645
June	2426.045		10677.02	1992.65
July	1632.700		7431.40	2083.75
August	2106.625		9450.32	2095.05
September	1790.050		8150.10	1964.45
October	2789.300		12579.74	1926.225
November	1467.925		6706.95	1902.50
December	2087.225		9556.43	1998.50
Total received	20873.195	4.7045	98202.00	
Total available	24717.46	4.7524	117467.01	
Total consumed		4.7524	113240.54	23828.125
On hand December 31, 1919	889.335	4.7524	4226.47	

REMARKS—Total consumed includes 467.75 tons of coal used in furnishing heat and hot water to Municipal Bath House and Police Department Shops.

COAL ACCOUNT

HARRISON STREET PUMPING STATION—YEAR 1919

	Tons	Price Per Ton	Cost	Tons Consumed
On Hand January 1, 1919	1738.875	$4.8157	$8374.05	
Received during:				
January	455.825	....	2512.06	983.9045
February	997.700	....	5218.97	748.872
March	1007.450	....	5216.68	906.6965
April	235.600	....	1219.96	789.277
May	100.000	....	402.17	976.920
June	1008.950	....	4453.51	882.635
July	1130.725	....	5024.83	923.000
August	747.475	....	3126.06	909.955
September	805.875	....	3570.03	901.297
October	835.125	....	3691.25	958.083
November	1124.475	....	5170.61	874.635
December	1073.125	....	4877.57	1009.559
Total received	9522.325	4.6722	44483.70	....
Total available	11261.20	4.6938	52857.75	....
Total consumed	....	4.6938	50997.29	10864.834
On hand December 31, 1919	396.366	4.6938	1860.46	....

REMARKS—Total consumed includes 82.12 tons coal consumed in furnishing heat to 1st District Water Pipe Extension office.

22nd STREET PUMPING STATION—YEAR 1919

	Tons	Price Per Ton	Cost	Tons Consumed
On Hand January 1, 1919	2828.675	$3.8792	$10973.04	
Received during:				
January	481.700	....	1954.45	1026.475
February	....	....	....	864.35
March	....	....	....	925.30
April	337.700	....	1401.38	684.50
May	704.625	....	2579.94	696.29
June	1110.850	....	3839.10	607.90
July	1964.700	....	6583.71	535.785
August	1040.8	....	3446.61	421.20
September	432.3	....	1434.37	572.90
October	406.1	....	1347.03	556.70
November	52.75	....	178.03	784.35
December	82.35	....	289.32	783.70
Total received	6613.875	3.4856	23053.94	....
Total available	9442.55	3.6035	34026.98	....
Total consumed	....	3.6035	30484.30	8459.45
On hand December 31, 1919	983.10	3.6035	3542.68	....

REMARKS—Total consumed includes 1093.5 tons coal consumed in furnishing heat and hot water to Bureau of Streets, Shops and Bathhouse.

COAL ACCOUNT

68th STREET PUMPING STATION—YEAR 1919

	Tons	Price Per Ton	Cost	Tons Consumed
On Hand January 1, 1919	5666.0	$3.6387	$20616.82	
Received during:				
January	1611.250	....	5960.68	2745.25
February	2589.100	....	10770.91	2697.1
March	4309.900	....	17725.76	2684.9
April	969.35	....	3986.74	2882.35
May	1089.85	....	4154.18	3517.85
June	2131.10	....	8072.61	2562.1
July	3938.40	....	15582.75	2907.4
August	4205.60	....	15256.44	3873.6
September	5733.10	....	22679.83	4009.1
October	4374.55	....	15348.87	3910.55
November	300.00	....	1262.29	3905.0
December	4103.05	....	15303.94	3339.05
Total received	35355.250	3.8496	136105.00	....
Total available	41021.250	3.8205	156721.82	....
Total consumed	....	3.8205	149130.48	39034.25
On hand December 31, 1919	1987.000	3,8205	7591.34	....

LAKE VIEW PUMPING STATION—YEAR 1919

	Tons	Price Per Ton	Cost	Tons Consumed
On Hand January 1, 1919	4728.00	$4.999	$23635.66	
Received during:				
January	874.01	....	4582.35	1572.806
February	1371.175	....	7228.97	1288.379
March	1533.935	....	8437.10	1365.935
April	435.26	....	2637.12	1272.26
May	....	....	....	1372.0
June	372.765	....	1737.46	1262.765
July	1231.25	....	5432.28	1364.25
August	1296.425	....	5901.33	1297.425
September	2411.900	....	9893.37	1436.9
October	1077.235	....	4651.04	1237.235
November	32.075	....	155.05	1388.075
December	1507.585	....	7283.31	1471.585
Total received	12143.615	4.7712	57939.38	....
Total available	16871.615	4.835	81575.04	....
Total consumed	....	4.835	78954.44	16329.615
On hand December 31, 1919	542.00	4.835	2620.60	....

COAL ACCOUNT

CENTRAL PARK AVENUE PUMPING STATION—YEAR 1919

	Tons	Price Per Ton	Cost	Tons Consumed
On Hand January 1, 1919	7662.95	$3.8313	$29359.75	
Received during:				
January	1790.45		6240.58	2686.85
February	1383.20		5355.75	2555.80
March	3091.95		12904.25	2622.55
April	1050.40		4383.85	2082.8
May				2280.1
June	378.95		1567.13	2480.55
July	3188.30		12278.81	2812.15
August	4682.70		18364.79	2645.0
September	3021.80		11874.19	2690.3
October	3022.00		10522.60	2656.4
November	1005.90		3602.13	2110.2
December	960.95		3811.91	2587.35
Total received	23576.60	3.8558	90905.99	
Total available	31239.55	3.8498	120265.74	
Total consumed		3.8498	116302.38	30210.05
On hand December 31, 1919	1029.50	3.8498	3963.36	

REMARKS—Total consumed included 944.95 tons coal consumed in furnishing heat and hot water to Municipal Natatorium.

SPRINGFIELD AVENUE PUMPING STATION—YEAR 1919

	Tons	Price Per Ton	Cost	Tons Consumed
On Hand January 1, 1919	4976.41	$3.9563	$19688.42	
Received during:				
January	1950.30		7674.16	1957.09
February	1034.80		4590.37	1469.15
March	1078.95		4858.12	1642.41
April	310.85		1398.20	1598.10
May				1716.26
June	908.15		3306.69	1650.09
July	1965.70		7548.53	1756.49
August	1563.25		5874.56	1542.65
September	2267.10		8593.33	1365.26
October	4968.70		19663.88	1611.98
November	324.50		1161.71	1554.47
December	129.50		556.05	1555.97
Total received	16501.80	3.9523	65220.60	
Total available	21478.21	3.9533	84909.03	
Total consumed		3.9533	76772.06	19419.92
On hand December 31, 1919	2058.29	3.9533	8136.96	

REMARKS—Total consumed includes 621.85 tons coal consumed in furnishing heat and hot water to Municipal Natatorium.

COAL ACCOUNT

ROSELAND PUMPING STATION—YEAR 1919

	Tons	Price Per Ton	Cost	Tons Consumed
On Hand January 1, 1919............	3899.00	$3.4645	$13508.26	
Received during:				
January..........................	1178.50	....	4106.22	1878.90
February.......................	1481.10	....	5500.81	1509.10
March..........................	1579.95	....	5852.45	1478.75
April..........................	377.65	....	1398.89	1363.45
May..........................	....	....	....	1527.40
June..........................	1074.45	....	3843.31	1621.35
July..........................	1861.10	....	6469.67	1638.20
August........................	1742.95	....	6524.63	1731.05
September.....................	2308.03	....	8842.23	1373.33
October.......................	3146.70	....	12397.81	1537.30
November......................	244.40	....	873.49	1576.90
December......................	465.30	....	1783.30	1873.40
Total received......................	15460.13	3.7252	57592.81	....
Total available......................	19359.13	3.6727	71101.07	....
Total consumed.....................	....	3.6727	70182.88	19109.13
On hand December 31, 1919..........	250.00	3.6727	918.19	....

REMARKS—Total consumed includes 1535.49 tons coal consumed in furnishing heat and hot water to Municipal Natatorium.

MAYFAIR PUMPING STATION—YEAR 1919

	Tons	Price Per Ton	Cost	Tons Consumed
On Hand January 1, 1919............	5235.00	$4.0462	$21182.16	
Received during:				
January........................	1446.15	....	5059.21	1138.65
February.......................	1472.65	....	5677.07	1164.15
March..........................	854.55	....	3521.00	1201.55
April..........................	240.70	....	991.76	1092.70
May..........................	....	....	....	1200
June..........................	653.70	....	2472.95	1299.70
July..........................	1387.25	....	5195.25	1456.25
August........................	820.1	....	2642.36	1527.10
September.....................	1707.40	....	5867.82	1383.40
October.......................	3575.90	....	11869.02	1420.90
November......................	341.25	....	1206.69	1475.25
December......................	362.70	....	1331.43	1526.70
Total received......................	12862.35	$3.5635	$45834.56	....
Total available......................	18097.35	3.7031	67016.72	....
Total consumed.....................	....	3.7031	58829.11	15886.35
On hand December 31, 1919..........	2211.00	3.7031	8187.61	....

COAL ACCOUNT

MAJOR PUMPING STATIONS—YEAR 1919

	Tons	Price Per Ton	Cost	Tons Consumed
On Hand January 1, 1919	45073.181	$4.2014	$189371.61	
Received during:				
January	12275.785	....	51398.60	18074.203
February	13047.565	....	58483.55	15916.2545
March	16974.535	....	77006.80	16897.3605
April	4391.235	....	19681.81	15189.3155
May	3730.02	....	15452.16	16152.475
June	11273.49	....	45383.39	15998.1975
July	19092.42	....	75088.00	16421.80
August	20003.70	....	78436.19	17620.805
September	22938.14	....	92177.21	17067.662
October	28188.16	....	109834.09	17357.173
November	5784.425	....	24312.87	17367.425
December	10771.785	....	44793.26	18191.214
Total received	168471.26	$4.1078	$692047.93	....
Total available	213544.441	4.1276	881419.54	....
Total consumed	....	4.1328	835878.06	202253.885
On hand December 31, 1919	11290.556	4.0335	45541.48	....

MUNICIPAL POWER PLANT—YEAR 1919

	Tons	Price Per Ton	Cost	Tons Consumed
On Hand January 1, 1919	2315.06	$3.40	$7871.20	
Received during:				
January	692.35	....	2428.50	1198
February	1311.35	....	5011.98	1036.5
March	1429.74	....	5283.46	1110
April	....	....	....	842
May	....	....	....	860
June	....	....	....	337
July	263.35	....	821.65	382.35
August	1193.00	....	3795.32	386.40
September	633.60	....	2195.44	382.9
October	1212.55	....	3962.12	849.0
November	986.35	....	3230.34	1117
December	916.70	....	3305.24	1477.9
Total received	8638.99	$3.4766	$30034.05	....
Total available	10954.05	3.4604	37905.25	....
Total consumed	....	3.4604	34531.37	9979.05
On hand December 31, 1919	975.00	3.4604	3373.88	....

COAL ACCOUNT

95th STREET PUMPING STATION—YEAR 1919

	Tons	Price Per Ton	Cost	Tons Consumed
On Hand January 1, 1919	368.950	$3.9843	$1470.00	
Received during:				
January	....		....	138.41
February	201.800	....	1124.63	125.88
March	108.100	....	602.44	193.14
April	112.350	....	626.13	130.16
May	137.850	....	476.96	166.41
June	177.350	....	630.48	110.06
July	90.200	....	297.84	112.62
August	....		....	115.50
September	272.050	....	935.58	110.5
October	141.950	....	456.23	140.15
November	....	....	....	125.72
December	141.400	....	523.86	155.76
Total received	1383.050	$4.1026	$5674.15	....
Total available	1752.000	4.0777	7144.15	....
Total consumed	....	4.0777	6623.55	1624.33
On hand December 31, 1919	127.67	4.0777	520.60	....

STONY ISLAND AVENUE PUMPING STATION—YEAR 1919

	Tons	Price Per Ton	Cost	Tons Consumed
On Hand January 1, 1919	266.400	$3.8811	$ 1033.93	
Received during:				
January	99.100	....	388.48	125.55
February	33.250	....	185.30	118.305
March	167.000	....	930.69	189.59
April	127.850	....	712.51	182.62
May	113.300	....	383.70	171.645
June	284.175	....	955.13	156.595
July	154.800	....	522.30	131.87
August	52.700	....	185.98	124.84
September	335.150	....	1227.65	171.975
October	142.000	....	510.35	98.610
November	....	....	....	145.65
December	114.700	....	424.94	159.155
Total received	1624.025	$3.9575	6427.03	....
Total available	1890.425	3.9467	7460.96	....
Total consumed	....	3.9467	7010.95	1776.405
On hand December 31, 1919	114.020	3.9467	450.01	....

COAL ACCOUNT

KENSINGTON PUMPING STATION—YEAR 1919

	Tons	Price Per Ton	Cost	Tons Consumed
On Hand January 1, 1919............	178.490	$4.7828	$ 853.69	
Received during:				
January........................	19.550	....	104.79	91.00
February......................	89.920	....	501.12	81.90
March..........................	194.925	....	1086.32	103.5275
April...........................	27.575	....	153.67	90.95
May............................	95.650	....	417.03	102.15
June............................	75.250	....	335.16	80.85
July............................	50.850	....	226.49	81.8825
August.........................	215.3075	....	1014.92	79.93
September.....................	78.4625	....	362.34	77.10
October........................	161.725	....	713.37	88.00
November.....................	34.075	....	151.77	86.95
December......................	....	....	....	96.65
Total received......................	1043.29	$4.8567	$ 5066.98	....
Total available.....................	1221.78	4.846	5920.67	....
Total consumed.....................	....	4.846	5141.00	1060.89
On hand December 31, 1919..........	160.89	4.846	779.67	....

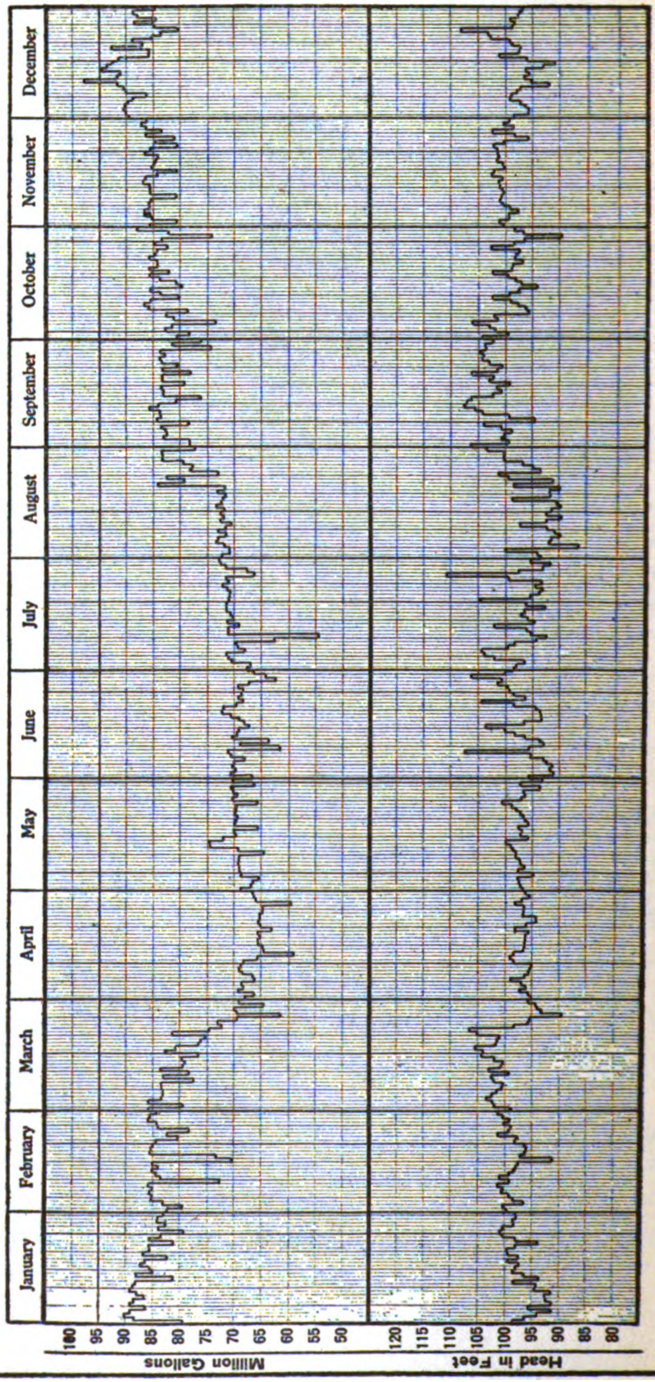
SUMMARY SEWAGE PUMPING STATIONS—YEAR 1919

	Tons	Price Per Ton	Cost	Tons Consumed
On Hand January 1, 1919............	813.84	$4.1256	$ 3357.62	
Received during:				
January........................	118.65	....	493.27	354.96
February......................	324.97	....	1811.05	326.085
March..........................	470.025	....	2619.45	486.2575
April...........................	267.775	....	1492.31	403.73
May............................	346.80	....	1277.69	440.205
June............................	536.775	....	1920.77	347.525
July............................	295.85	....	1046.63	326.3725
August.........................	268.0075	....	1200.90	320.27
September.....................	685.6625	....	2525.57	359.575
October........................	445.675	....	1679.95	326.76
November.....................	34.075	....	151.77	358.32
December......................	256.10	....	948.80	411.565
Total received......................	4050.365	$4.2386	$17168.16	....
Total available.....................	4864.205	4.2197	20525.78	....
Total consumed.....................	....	4.2082	18775.50	4461.625
On hand December 31, 1919..........	402.58	4.3476	1750.28	....

DIAGRAMS OF PUMPAGE AND HEAD

1919

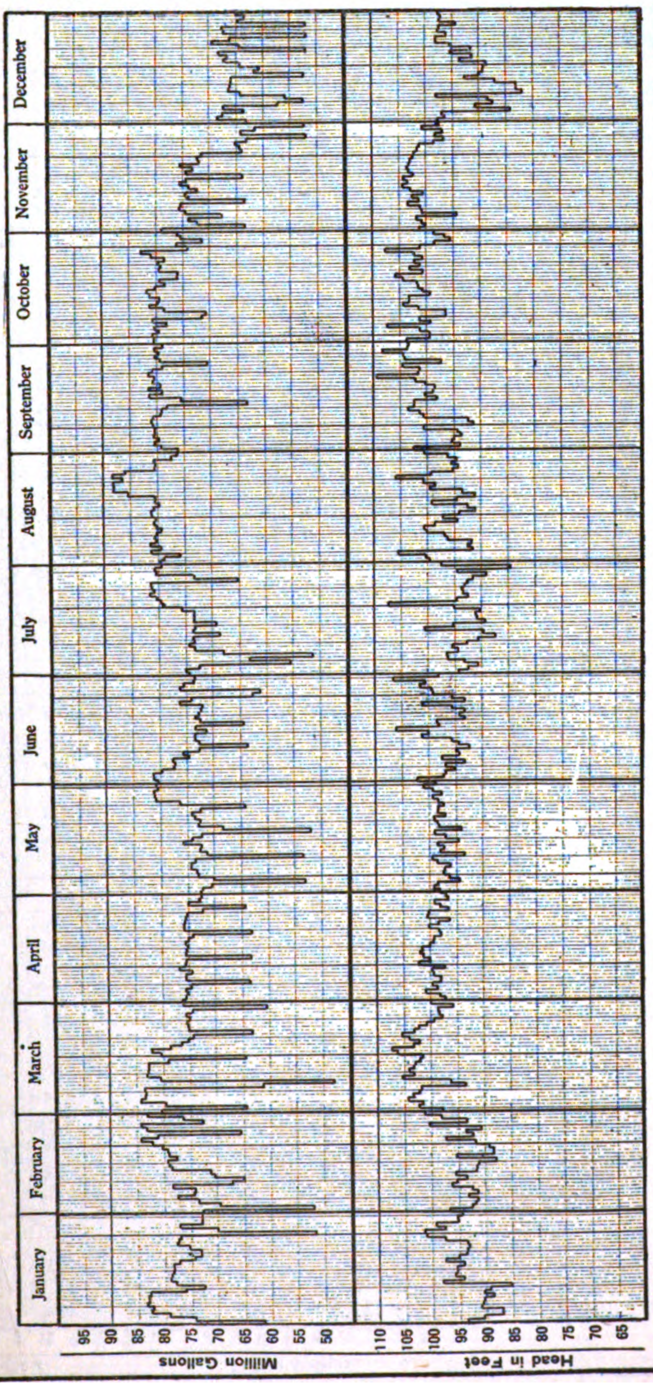
CHICAGO AVENUE PUMPING STATION



DIAGRAMS OF PUMPAGE AND HEAD

1919

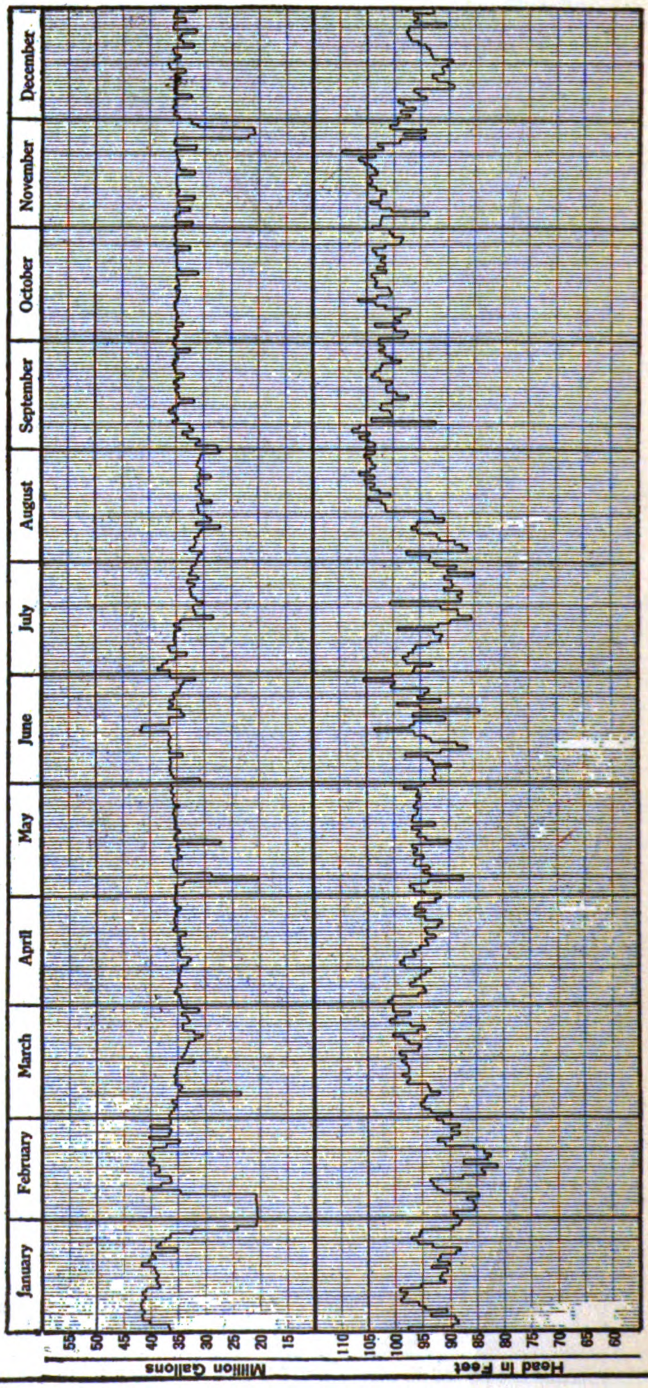
14TH STREET PUMPING STATION

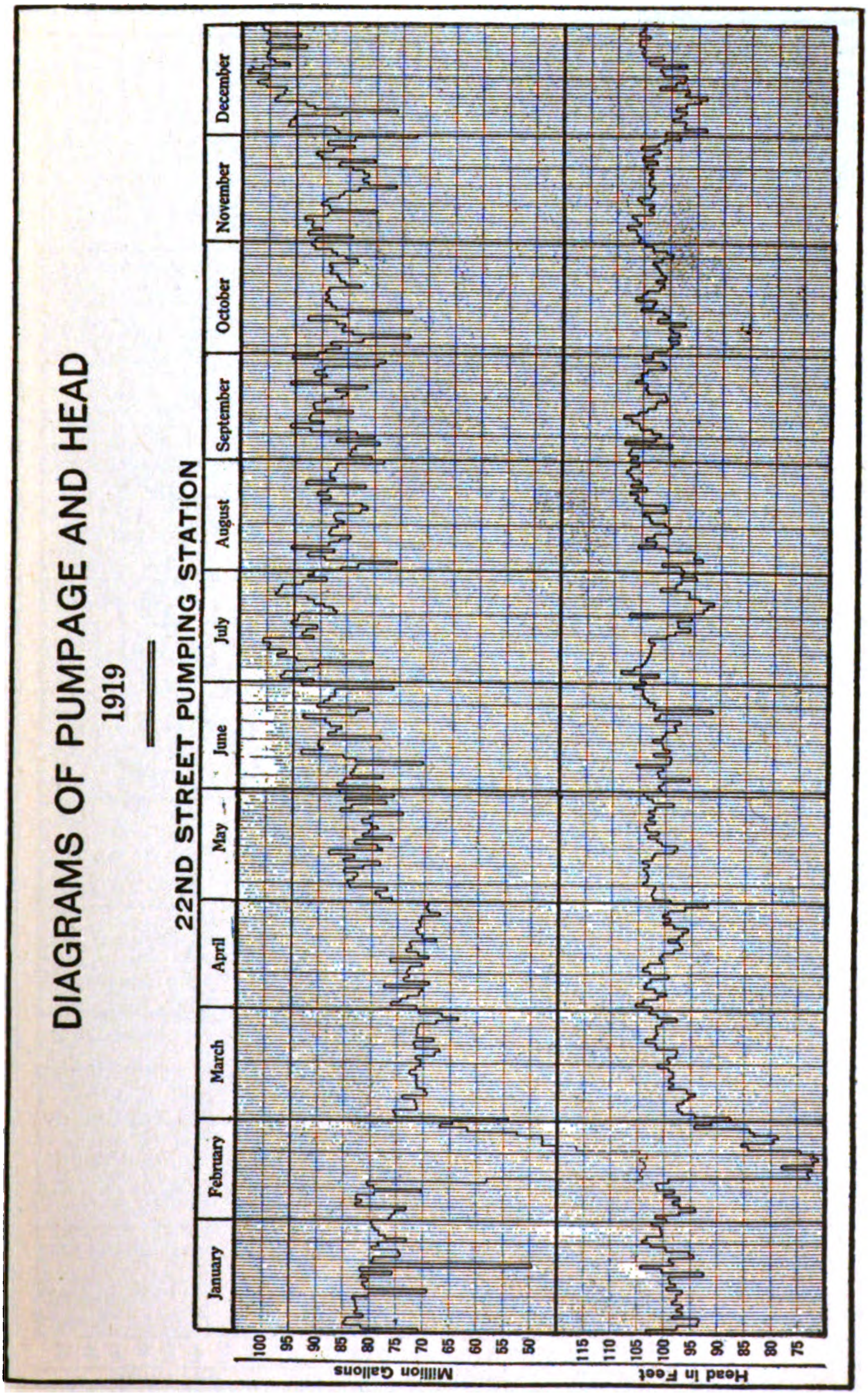


DIAGRAMS OF PUMPAGE AND HEAD

1919

HARRISON STREET PUMPING STATION





DIAGRAMS OF PUMPAGE AND HEAD

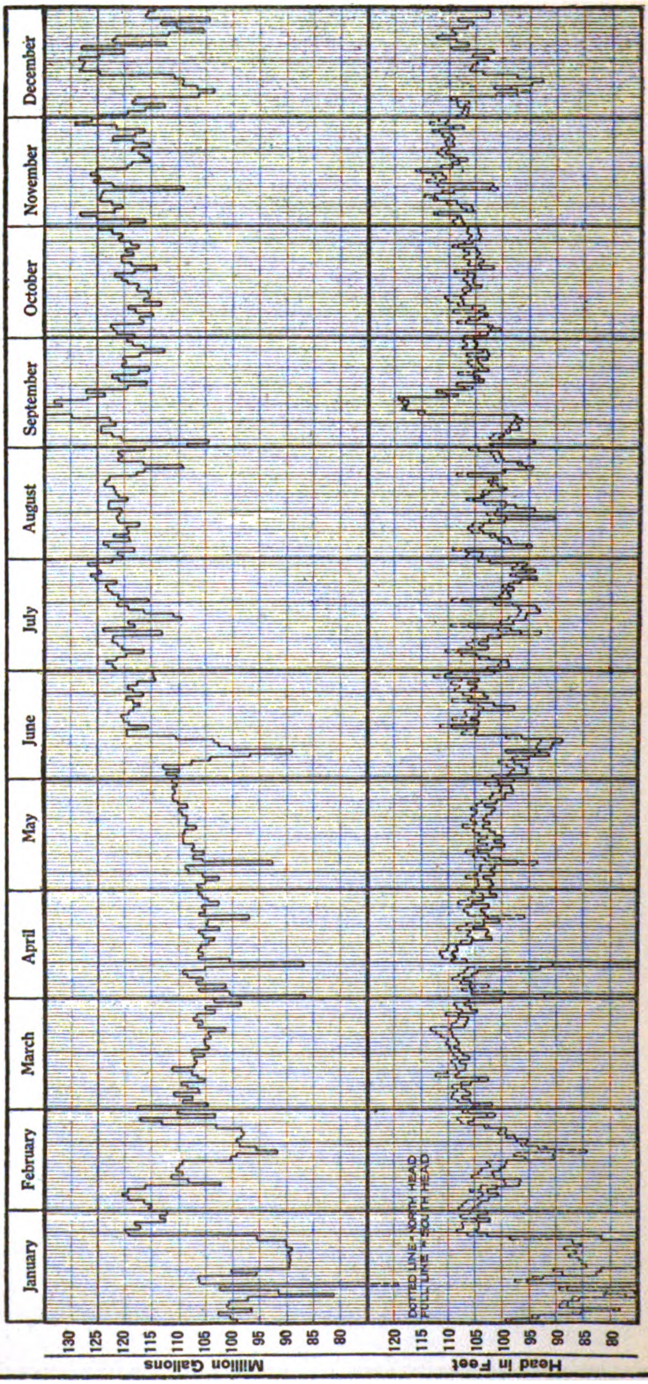
1919

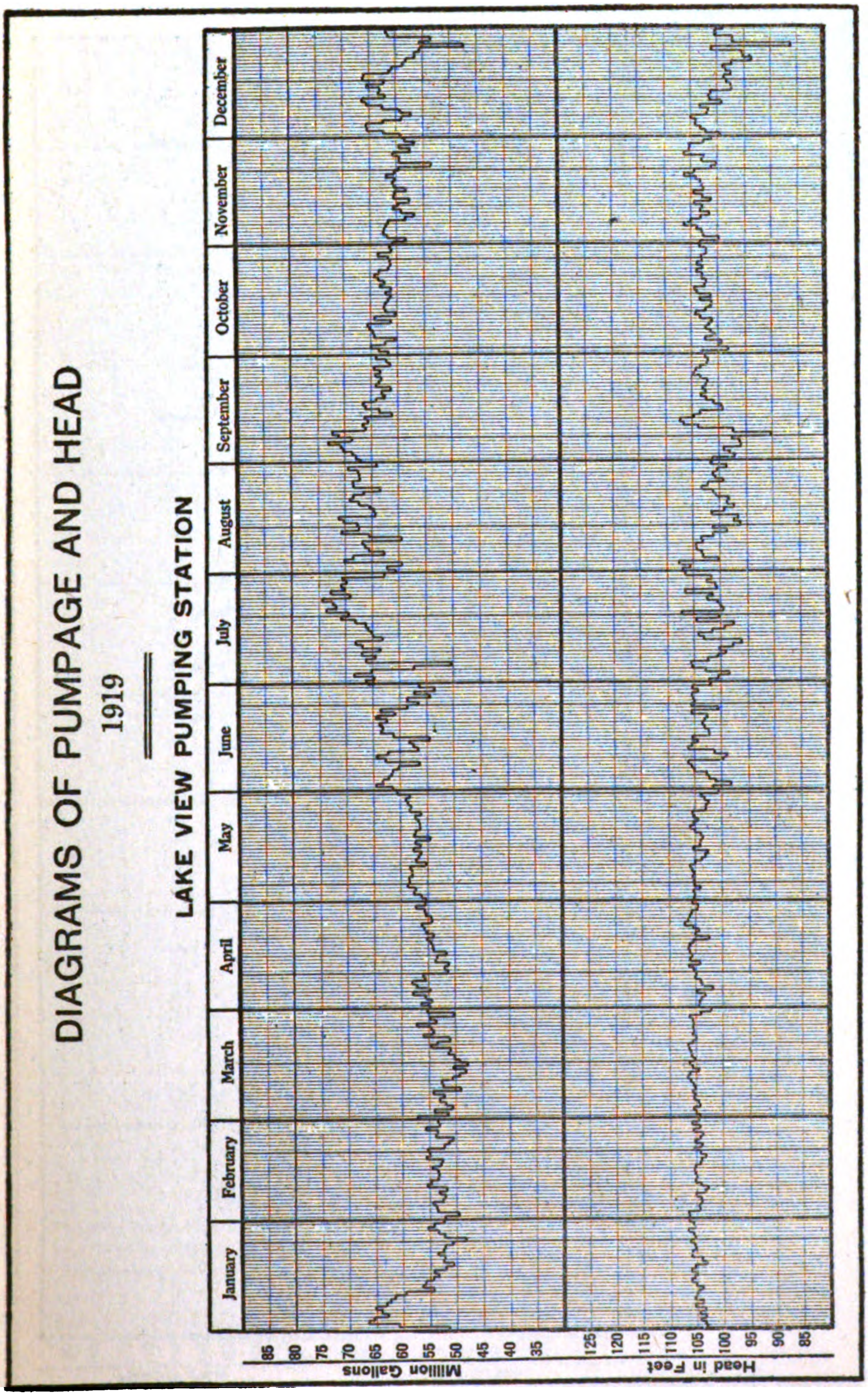
22ND STREET PUMPING STATION

DIAGRAMS OF PUMPAGE AND HEAD

1919

68TH STREET PUMPING STATION





DIAGRAMS OF PUMPAGE AND HEAD

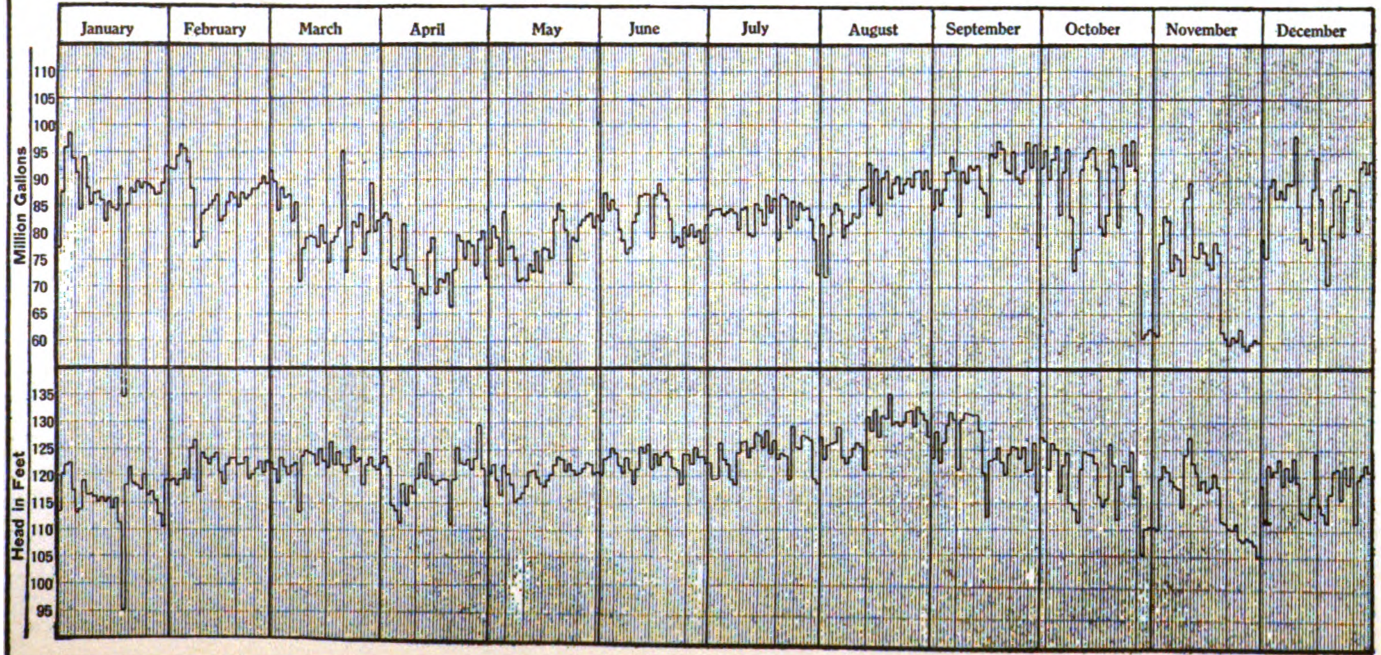
1919

LAKE VIEW PUMPING STATION

DIAGRAMS OF PUMPAGE AND HEAD

1919

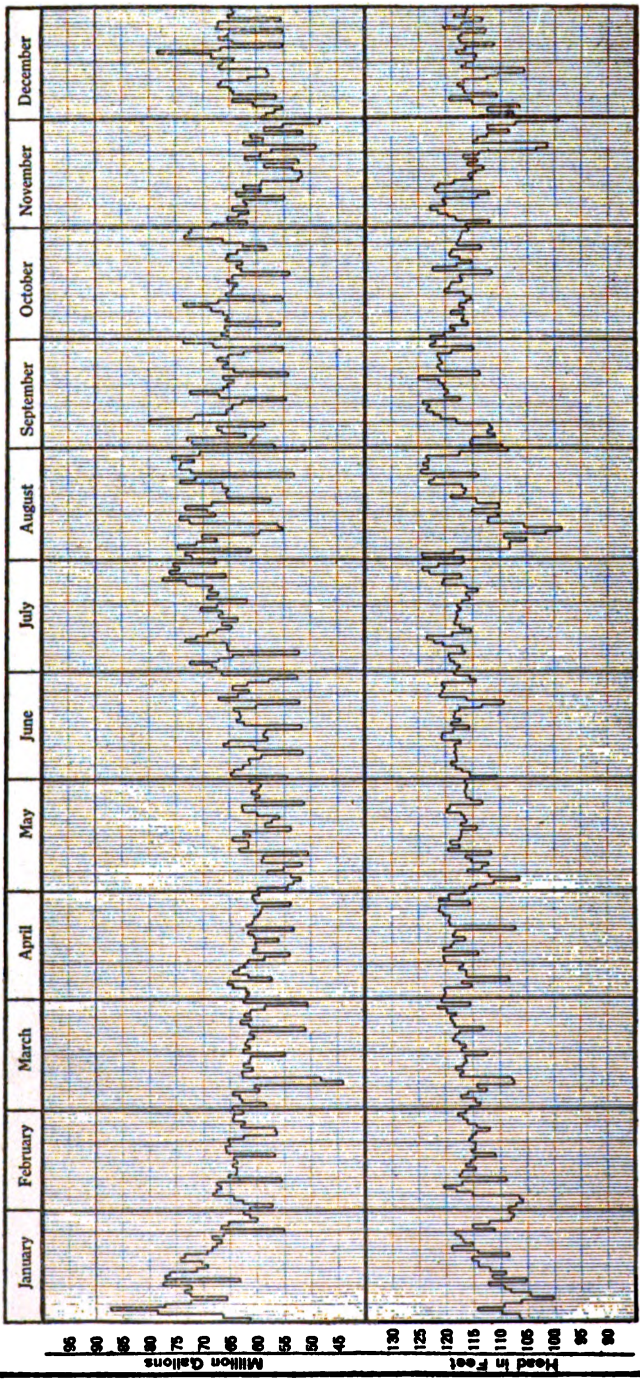
CENTRAL PARK AVENUE PUMPING STATION



DIAGRAMS OF PUMPAGE AND HEAD

1919

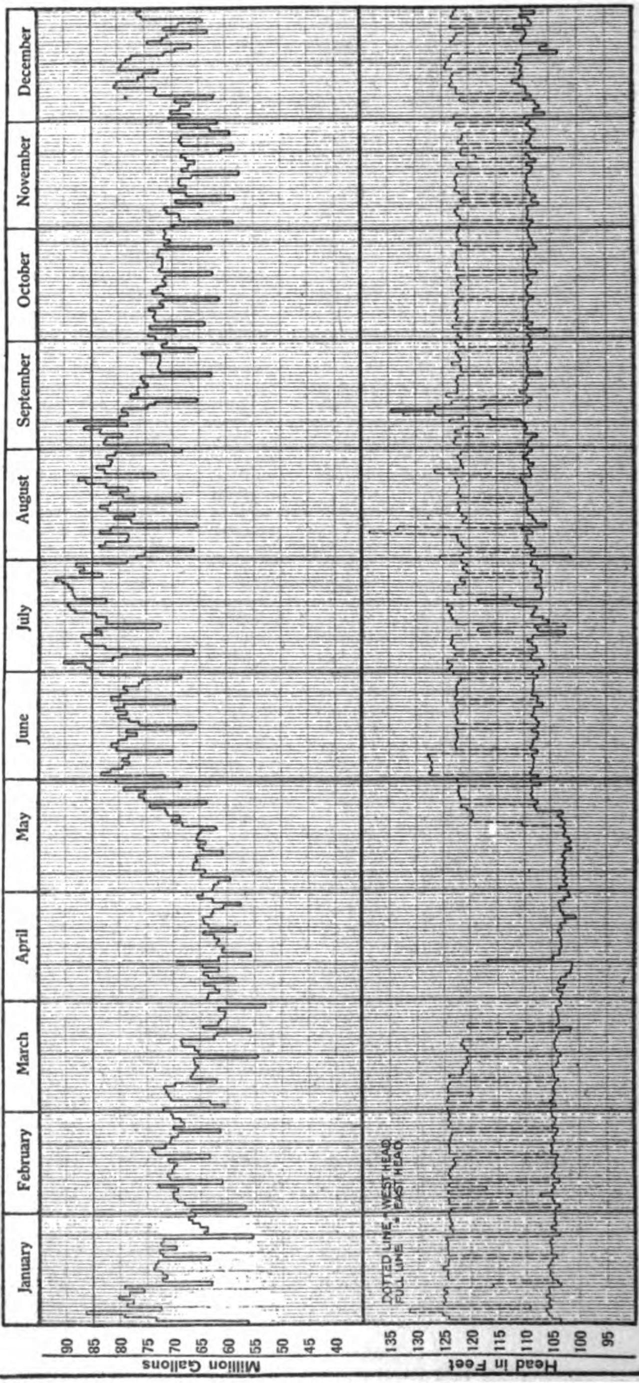
SPRINGFIELD AVENUE PUMPING STATION

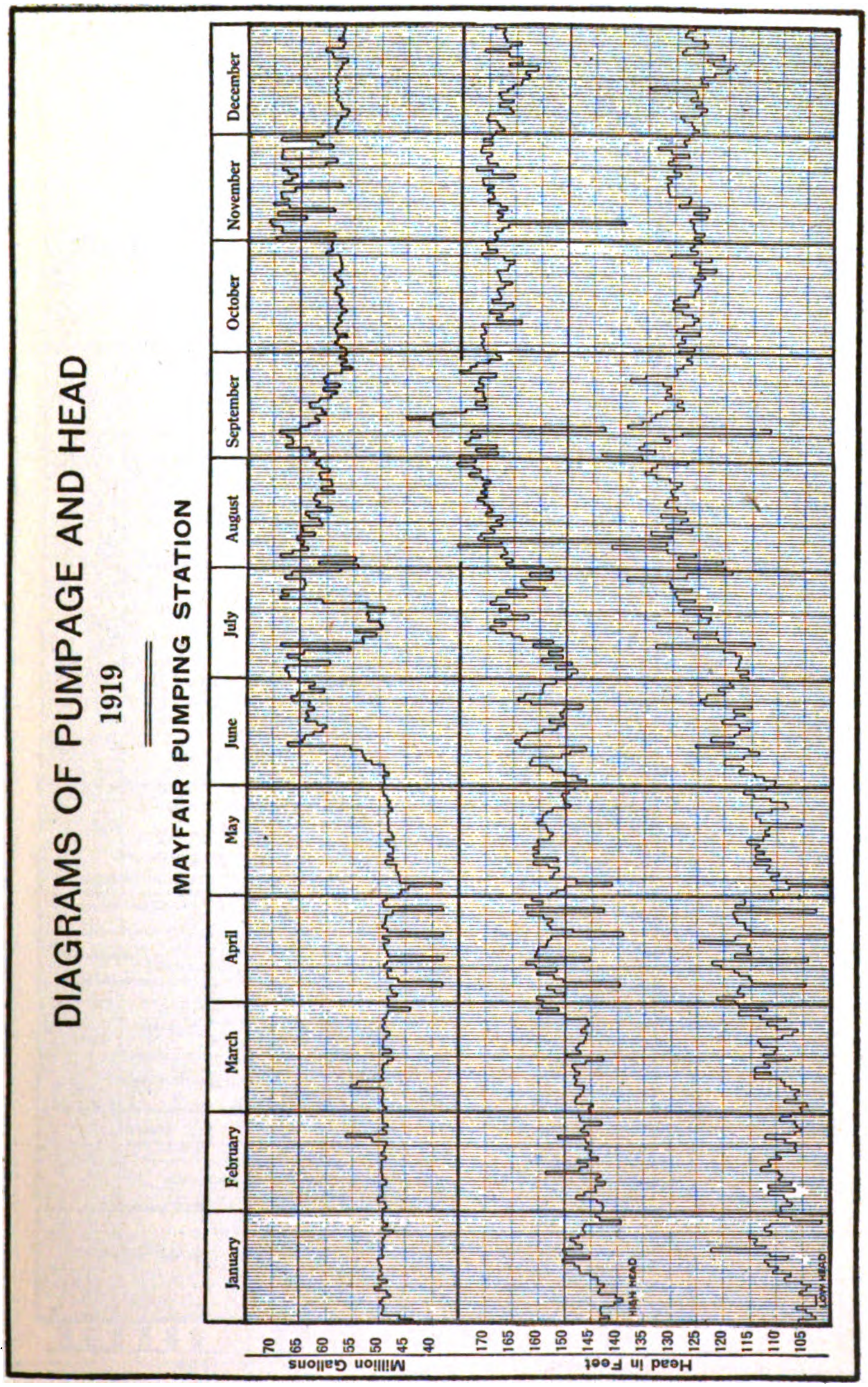


DIAGRAMS OF PUMPAGE AND HEAD

1919

ROSELAND PUMPING STATION





DIAGRAMS OF PUMPAGE AND HEAD

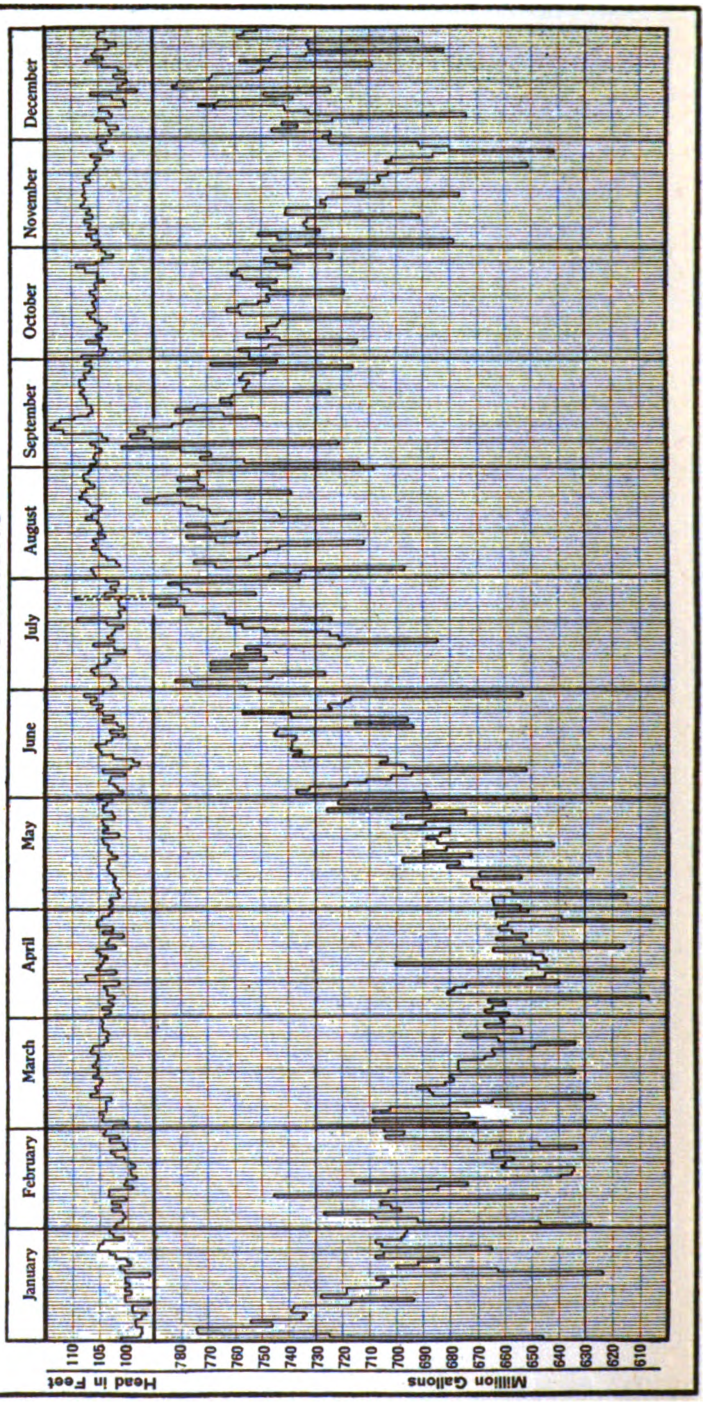
1919

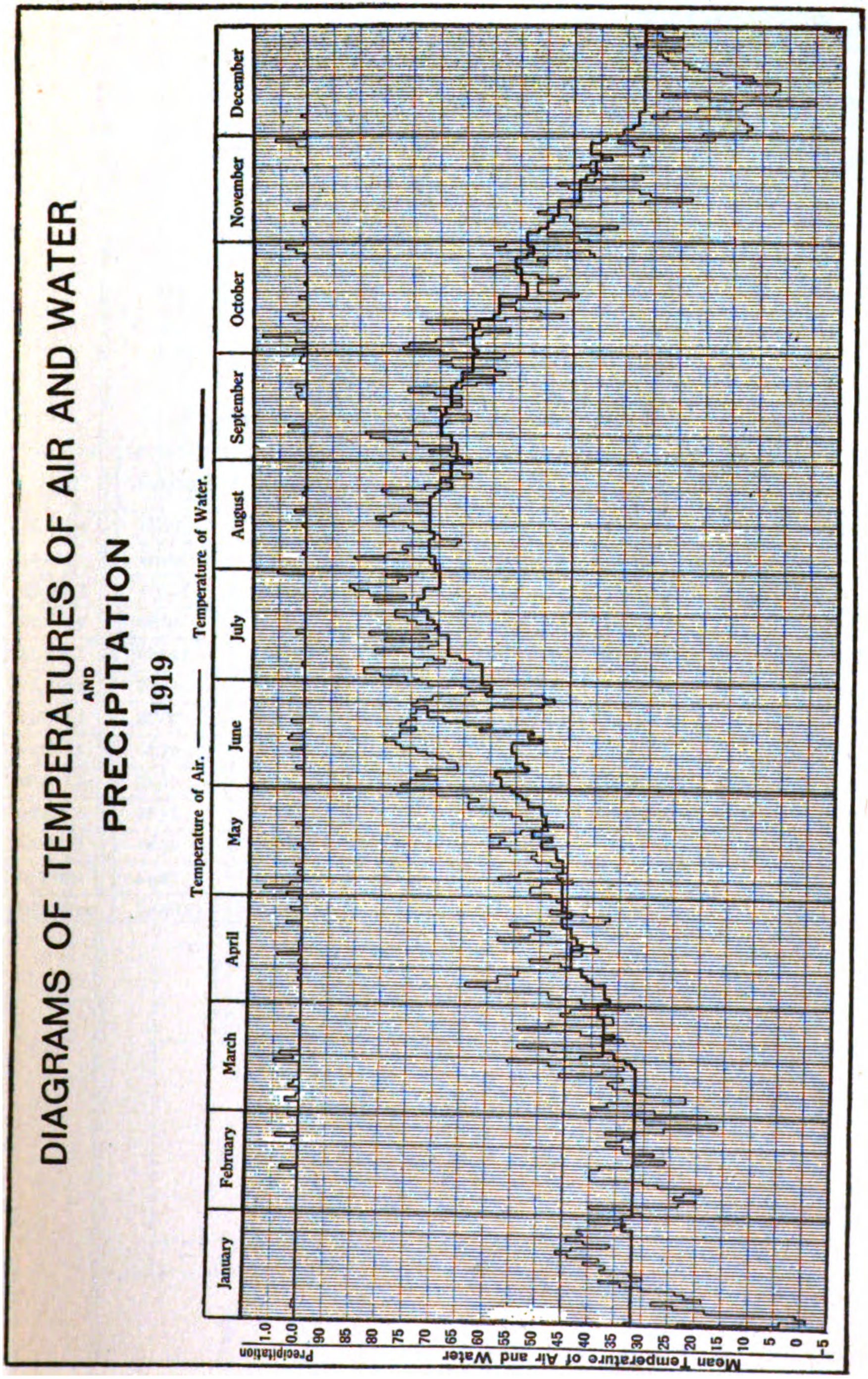
MAYFAIR PUMPING STATION

DIAGRAMS OF TOTAL PUMPAGE AND AVERAGE HEAD

1919

MAJOR PUMPING STATIONS





DIAGRAMS OF TEMPERATURES OF AIR AND WATER
AND
PRECIPITATION
1919

Temperature of Air. ——— Temperature of Water. ———

SEWAGE PUMPING STATIONS

Monthly Pumpage in Millions of Gallons—1919

	Stony Island Ave.	95th Street	Kensington	Pullman	Hegewisch	Total
January..........	878.89	928.91	113.85	86.25	79.41	2,087.31
February.........	821.65	801.01	102.50	79.42	68.84	1,873.42
March............	1,209.50	1,632.21	130.72	107.46	153.13	3,233.02
April............	923.89	961.04	114.87	80.90	86.90	2,167.60
May..............	1,305.16	1,521.18	129.48	100.44	146.48	3,202.74
June.............	1,013.73	720.57	112.11	74.44	66.92	1,987.77
July.............	915.14	668.98	114.57	71.00	60.88	1,830.57
August...........	879.71	623.88	113.23	65.30	62.57	1,744.69
September........	929.92	622.35	112.71	66.68	61.43	1,793.09
October..........	1,067.15	991.67	121.92	68.66	71.66	2,321.06
November.........	771.00	698.46	114.58	67.71	68.81	1,720.56
December.........	986.35	732.97	113.13	74.31	76.44	1,983.20
Total.........	11,702.09	10,903.23	1,393.67	942.57	1,003.47	25,945.03

SEWER PUMPING STATIONS—CITY OF CHICAGO, DECEMBER 31, 1919

Station	PUMPS										
	No.	Type	Capacity Gallons in 24 Hours	Head Feet	Date	DRIVING ENGINE OR MOTOR	Steam Cylinder	Stroke	R.P.M	Condenser	Air Pump
95th Street.	2	Elev. C. L. of Pump—6' Vert. Centrifugal—6'..	71,280,000	12	1919	Horizontal Cross Compound Condensing Corliss Engine, Allis-Chalmers Co.....	16" and 32"	30"	86	Jet	Direct Conn.
	3	Vert. Centrifugal—7'..	71,280,000	12	1909	Horizontal Cross Compound Condensing Corliss Engine, Allis-Chalmers Co.....	16" and 32"	30"	86	Jet	Direct Conn.
	1	Vert. Centrifugal—7'..	24,300,000	14	1909	Horizontal Cross Compound Condensing Corliss Engine, Allis-Chalmers Co.....	9" and 18"	24"	90–125	Jet	Dean—Independent
Stony Island Ave......	1	Elev. C.L.of Pump—11' Vert. Centrifugal—11'.	12,000,000	10	1906	Horizontal Triple Exp. Condensing Corliss Engine, Allis-Chalmers Co........	8" and 13" and 18"	24"	80	Jet	Direct Conn. (Disconnected.)
	2	Vert. Centrifugal—11'.	24,000,000	10	1906	Horizontal Triple Exp. Condensing Corliss Engine, Allis-Chalmers Co.......	9½" and 16½" and 23"	30"	80	Jet	Direct Conn.
	3	Vert. Centrifugal—8'..	72,000,000	10	1906	Horizontal Cross Compound Corliss Engine, Allis-Chalmers Co...........	14" and 28"	30"	80	Jet	Direct Conn.
	4	Vert. Centrifugal—8'..	72,000,000	10	1906	Horizontal Cross Compound Corliss Engine, Allis-Chalmers Co...........	14" and 28"	30"	80	Jet	Direct Conn.
Kensington.	1	10" Hor. Centrifugal...	5,000,000	.....	1896	Vertical Cross Compound Condensing S. A. Westinghouse Engine..........	9" and 15"	9"	300	Jet	4½" x 8" x 4"
	2	10" Hor. Centrifugal...	5,000,000	.....	......	Vertical Cross Compound Condensing S. A. Westinghouse Engine..........	9" and 15"	9"	300	Jet	4½" x 8" x 4"
Pullman....	1	8" Hor. Centrifugal....	3,000,000	75	1915	75 H.P.G.E. Motor—60 Cy. 230 V.A.C..	....	.....	.....	.....	....
	2	8" Hor. Centrifugal.... Amer. Well Works	3,000,000	75	......	75 H.P.G.E. Motor—60 Cy. 230 V.A.C..	....	.....	.....	.....	....
Hegewisch..	1	20" Hor. Centrifugal...	10,000,000	.....	1909	40 H. P. Foos Horizontal Single Cylinder Gas Engine........	....	.....	.....	.....	....
	2	20" Hor. Centrifugal...	10,000,000	.....	......	40 H. P. Foos Horizontal Single Cylinder Gas Engine........................	....	.....	.....	.....	....

BOILER PLANTS OF STEAM ENGINE-DRIVEN SEWAGE PUMPING STATIONS

Station	No.	Size	Type	Tubes			Steam Drum	Steam Pressure		Furnace or Stoker				Breeching sq. ft.		Stack			Remarks
				Heating Surface	No.	Size	Diam.	No. R. P. M.	Max.	Type	Name	Size	Grate Surface	Area at Boiler	Area at Stack	Diam.	Height	Material	
	3	150 H. P.	Edgemoor Water Tube, 1909........	1432	76	4"x20' 0"	36"	100	150	Hand Fired	20th Century Shaking Grates........	2'4"x6'6" Twin	30.4	....	....	4' 6"	130'	Brick	....
	3	100 H. P.	McNaull Water Tube, 1906..............	....	48	4"x18' 0"	36"	100	150	Hand Fired	Martin Shaking Grate	4'0"x5'0"	20	6.2	25	5' 0"	150'	Brick	....
Stony Island Ave....	1	193 H. P.	Keeler Cross Drum Water Tube, 1915..	1925	100 13 13	4"x16' 0" 4'x15' 0¾" 4"x2' 4 11/16"	48"	....	175	Underfeed.	Type "E" Combustion Engine Co....	6'6"x6'0"	39	10.5	....	....	....	....	Fan American-Blower Co. No. 45
										Forced Draft Stoker	....	....	....	....	....	....	....	....	Fan Engine 4¼"x5" Troy Vert. Eng.
Kensington....	2	50 H. P.	Horis. Return Tubular 54"x12' 0"......... Stillwell Bierce Smith Valve Co., 1896	....	46	3½"x12' 0"	....	....	80	Hand Fired	Martin Shaking Grates............	4'0"x4'6"	18	....	....	36"	80'	Brick	....

Acct. No.
101
102
111
112
121
122
123
125
131
132

Rated capacity of boiler plant in
Capacity of boiler plant in 1000 .
Per cent of boiler plant capacity
Tons of coal consumed for opera
Tons of coal consumed for outsi
Tons of ash and refuse (estimat
Mean heat value per pound of d
Cost per ton of coal..........

Rated capacity of reciprocating
Rated capacity of steam centrif
Rated capacity of electrical cent
Total rated capacity of station i
Actual rated capacity in operati
Actual rated capacity in operati
Per cent of rated capacity devel
Per cent of rated capacity devel
Steam pumpage in million gallo
Electrical pumpage in million ga
Maximum pumpage for one day
Average head in feet for year...
Steam pumpage in million foot
Electrical pumpage in million fo
Rated pumpage in million foot
capacity while actually operat
Pump load factor, per cent.....
Pounds of coal consumed per mi
Station duty, foot pounds per m
Parts of chlorine used per millio

TOTAL COS

Total cost of pumping one millio
Labor cost of pumping one milli
Fuel cost of pumping one million
Electrical power cost of pumping
Total cost of pumping one millio
Ratio of cost of coal to cost of la
Cost of coal and ash handling pe
Cost of operating labor used on

REPAIRS AND MAINTENA
- Buildings and grounds.....
- Main pumping units—recipr
- Main pumping units—steam
- Main pumping units—electr
- Boilers and furnaces.......
- Piping and steamfitting....
- Coal and ash handling plant
- Electrical and miscellaneous
- Chlorine apparatus........

TOTAL COST

Stati	Stack			Remarks
	Diam.	Height	Material	
	' 6"	130'	Brick	....
Stony Isla Ave	5' 0"	150'	Brick	....
	.....	.....	.....	Fan American-Blower Co. No. 45
	.....	.....	.....	Fan Engine 4½"x5" Troy Vert. Eng.
Kens ton.	36"	80'	Brick	....

125b

Acct. No.

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102
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112
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125
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133
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142
143

211
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213
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300
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401
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413
421
422
423
431
432
440
450
460
470
480

501
502

601
602

704
720
730
740

ACCOUNTING DIVISION

Mr. FRANK B. ALT, Acting Chief Clerk.

The Accounting Division of the Bureau of Engineering maintains a record of detailed expenditures of the various activities of the separate divisions of the Bureau.

In addition to the detail accounting, the general office is also concerned in the disposition of general correspondence, the preparation of many reports, the preparation and passing of all contract vouchers, requisitions, bills and warrants for collection of the various divisions of the Bureau, and also the compiling of the request for annual appropriations.

The following five tables show comparative costs of operation of pumping stations.

SEWER PUMPING STATIONS—COMPARATIVE ANNUAL ANALYSIS OF PUMPING COSTS

COMPARATIVE DATA	95th Street	Stony Island	Kensington	Pullman	Hegewisch	Total	Rogers Park
Rated Capacity of Boiler Plant in 1000 H. P. Hours for Year	3942.00	4309.93	876.00			9127.93	
Capacity of Boiler Plant in 1000 H. P. Hours Out of Service for Repairs or Cleaning	1395.00	2063.60	411.90			3870.50	
Percent of Rated Boiler Plant Capacity out of Service for Repairs or Cleaning	35.4	47.8	47.0			42.4	
Yearly Rated Capacity of Pumps in Million Gallons at Fixed Head	58,035.00	70,810.00	3,650.00	2,109.00	7,300.00	141,985.00	
Estimated Pumpage in Million Gallons per Year Based on Speed and Head Disposal	10,903.23	11,702.09	1,393.67	942,57	1,003.47	25,945.03	
Percentage of Pumping Capacity in Service for Yrs.	18.8	16.5	38.2	43.0	13.7	18.3	
Average Head in Feet Against Pumps	11.2	6.5	13.5	40.2	9.1	10.2	
Pumpage in Million Foot Gallons	122,333.52	75,547.52	18,822.58	37,870.56	9,165.36	263,739.54	
Number of Tons of Coal Consumed for Operation	1,623.0	1,776.0	1.028.00			4,427.00	
Number of Tons of Coal Consumed for Outside Purposes			32.00			32.0	
B. T. U. per Pound of Coal Delivered							
Pounds of Coal Consumed per Million Foot Gallons	26.6	47.0	109.0			40.8	
Estimated Duty in Foot Pounds per Million B. T. U.	29,100,00	16,000,000	6,700,000			18,500,000	
TOTAL COST OF OPERATION	$ 30,038.37	$ 30,783.63	$ 17,869.03	$ 12,975.69	$ 8,583.30	$ 100,250.02	$ 12,650.85
Cost of Pumping One Million Gallons	2.75	2.63	12.80	13.75	8.58	3,86	
Labor Cost of Pumping One Million Gallons One Foot High	.170	.277	.581	.212	.718	.255	
Fuel Cost of Pumping One Million Gallons One Foot High	.068	.118	.338			.109	
Gas or Electric Power Cost of Pumping One Million Gallons One Foot High				.109	.164		
Total Cost of Pumping One Million Gallons One Foot High	.245	.407	.950	.334	.935	.38	
Cost of Coal and Ash Handling per Ton of Coal Consumed	.98	1.00	1.23			1.04	
Cost of Operating Labor Used on Repairs and Maintenance	339.63	204.55	1.20			545.38	
REPAIRS AND MAINTENANCE							
Buildings and Grounds	$ 65.74	$1,512.86	$ 18.47	$222.97	$ 163.19	$1,983.23	$2,211.76
Engines and Pumps	280.14	1,307.88	452.79		2,275.46	4,316.27	830.11
Boilers and Furnaces	1,043.58	336.17	551.17			1,931.52	
Piping and Steamfitting	208.99	437.69	33.53		18.98	699.19	
Coal and Ash Plant		145.15				145.15	
Electrical and Miscellaneous Equipment	30.05	86.07				116.12	
Total Cost of Repairs and Maintenance	$1,628.50	$3,825.82	$1056.56	$222.97	$2,457.63	$9,191.48	$3,041.87

Acct. No.	OPERATION
101	General Supervision
102	Clerical Service
111	Janitor Service
112	Care of Grounds
121	Supervision (Engine Room)
122	Electrical Attendance
123	Mechanical Attendance
125	Chlorine Attendance
131	Supervision (Boiler Room)
132	Firing
133	Boiler Washing
141	Vacations
142	Sick Leave
143	Miscellaneous (Absence)
	Total Labor
211	Wheeling Coal
212	Crushing Coal
213	Moving Coal
214	Conveyor Attendance
215	Handling Ashes
216	Unloading Coal
232	Ash Hauling
233	Weighing
234	Demurrage
235	Switching Cars
236	Testing Coal
261	Operation Coal
264	Outside Purposes Coal
	Total Fuel
300	Operating Power
310	Lighting Power
	Total Power
401	Oil
402	Grease
403	Graphite
412	Pump Valves
413	Sundries Machinery
421	Boiler Compound
422	Waste
423	Sundries Cleaning
431	Chlorine Used
432	Chlorinating Sundries
440	Lighting Supplies
450	Building Supplies
460	Toilet Supplies
470	Lawn Supplies
480	Miscellaneous Supplies
	Total Supplies
501	Street Car and Railway
502	Automobile
	Total Transportation
601	Purchase of Tools
602	Repair of Tools
	Total Tools
704	Miscellaneous Services
720	Furniture and Fixtures
730	Stationery and Office Supplies
740	Advertising
	Total Miscellaneous Expense
	GRAND TOTAL OPERATION

WATER PUMPING STATIONS—COST OF REPAIRS AND MA

	Chicago Avenue	22nd Street	68th Street	Lake View	Harrison Street	14th Street	Springfield Avenue	Central Park Av.	Roseland	Mayfair	Total
TOTAL BUILDINGS AND GROUNDS.	$ 7,179.98	$ 10,173.20	$ 6,444.17	$ 2,847.27	$ 841.82	$ 7,067.91	$ 3,893.14	$ 5,942.01	$ 2,822.69	$ 410.24	$ 47,622.43
Engine No. 1	4,346.41	103.12	9,044.15	1,229.48	8,131.88	651.80	767.67	2,374.21	712.92		
Engine No. 2	3,946.15	3,570.68	10,259.99	912.90	4,053.41	899.59	1,496.47	1,299.12	667.28	525.43	
Engine No. 3	2,396.37	218.13	93.19	1,358.95	3,875.92	752.13	850.12	1,202.14	914.52	664.20	
Engine No. 4	2,467.07	2,507.94	500.06	2,568.27		2,813.04	1,933.21	4,657.11	1,155.21	619.73	
Engine No. 5	723.43	334.84	1,550.67			781.45	271.98	5,257.59	331.58	464.44	
Engine No. 6		613.08	647.46						312.96	889.07	
Engine No. 7			204.26								
General Engine Room Cost	2,822.03	3,693.15	2,145.48	617.21	975.23	3,924.20	1,358.61	2,694.94	1,707.38	2,086.72	
TOTAL ENGINES AND PUMPS	$ 16,701.46	$ 11,040.90	$ 24,445.26	$ 6,686.81	$ 17,036.44	$ 9,822.21	$ 6,678.06	$ 17,485.11	$ 5,801.85	$ 5,249.59	$120,947.69
Boiler No. 1—Cost per H. P.	5.87		4.93	2.83	.91	3.56	1.02	3.47	2.85	.55	
Total Cost	1,462.61		1,682.91	907.71	316.99	889.85	665.45	1,733.04	854.90	274.30	
Boiler No. 2—Cost per H. P.	3.43		4.18	3.74	2.31	2.76		3.15	3.35	.43	
Total Cost	857.32		1,426.86	1,192.27	785.62	688.70	256.66	1,573.82	1,006.54	212.56	
Boiler No. 3—Cost per H. P.	2.93		39.90	3.34	1.74	4.57		2.89	1.85	49	
Total Cost	732.56		13,580.35	1,068.56	593.56	1,190.56	Removed	1,445.37	556.65	244.10	
Boiler No. 4—Cost per H. P.	4.22		38.50	Removed		3.20		3.94	1.68	.61	
Total Cost	1,052.86		13,102.72	223.04		797.89	Removed	1,972.12	503.83	303.63	
Boiler No. 5—Cost per H. P.	2.94		11.70	Removed		2.78		1.76	3.25	.52	
Total Cost	734.96		3,654.42	495.85		694.63	268.97	878.67	976.37	257.90	
Boiler No. 6—Cost per H. P.	3.52		10.30			4.72	Removed		3.12	.40	
Total Cost	882.13		3,502.29			1,179.29	252.36		937.01	200.91	
Boiler No. 7—Cost per H. P.		.61	11.30				Removed				
Total Cost		136.60	3.850,84				98.46				
Boiler No. 8—Cost per H. P.		1.88					Removed				
Total Cost		424.47					125.25				
Boiler No. 9—Cost per H. P.		2.00									
Total Cost		448.86									
Boiler No. 10—Cost per H. P.		1.98									
Total Cost		445.00									
General Boiler Room Cost	2,141.05	743.05	7,194.71	2,028.43	976.60	1,560.89	2,003.88	1,054.46	1,082.21	1,087.88	
Total Cost per H. P.	5.24	2.44	20.15		2.60	4.67		3.46	3.28	.86	
TOTAL BOILER AND FURNACES	$ 7,863.49	$ 2,197.98	$ 47,995.10	$5,915.86	$ 2,672.77	$ 7,001.81	$ 3,671.03	$ 8,657.48	$ 5,917.51	$ 2,581.28	$94,474.31
TOTAL PIPING AND STEAMFITTING.	2,465.84	815.65	2,594.13	2,981.85	1,316.94	7,266.04	1,910.92	1,067.63	1,073.94	1,384.12	22,877.16
TOTAL COAL AND ASH PLANT	3,411.18	53.55	5,323.72	2,889.98	241.31	4,099.17	808.02	1,000.37	1,476.52	1,155.90	20,459.72
TOTAL ELECTRIC GENERATOR SET			606.21	851.04			170.07	219.34	346.59		2,193.25
TOTAL MISC. EQUIPMENT	1,286.57	64,11	423.36	101.29	34.70	57.40	641.98	24.81	640.70	45.92	3,320.84
TOTAL CHLORINE PLANT	516.25	642.66	6,352.80	739.50	374.50	2,771.65	800.55	405.49	870.20	129.17	13,602.77
GRAND TOTAL COST REPAIRS AND MAINTENANCE	$ 39,424.77	$ 24,988.05	$ 94,184.75	$ 23,013.70	$ 22,518.48	$ 38,086.19	$ 18,573.77	$ 34,802.24	$ 18,950.00	$ 10,956.22	$325,498.17
NEW APPARATUS AND MACHINERY (106D10)			680.00		235.00		12,630.73	12,729.73	339.25	43.32	26,658.03

MARSHALL BOULEVARD MUNICIPAL PLANT

COL. HENRY A. ALLEN, Mechanical Engineer in Charge.

During the early part of the year investigations of the organization and operation of the Marshall Boulevard Municipal Plant were made by Mr. P. S. Combs, City Engineer, and Mr. V. S. Petterson, Assistant City Engineer, for the purpose of determining better methods.

The Mechanical Engineer in Charge was instructed to make a further detailed investigation and a complete report, including recommendations for improvement in building conditions. This report was completed and submitted in September, was approved by the City Engineer and the Commissioner of Public Works, and steps were taken to put into force such portions of the recommendations not requiring additional appropriations.

In December a transfer of funds amounting to $32,000 was passed by the City Council to make certain changes and additions to structures and equipment in line with recommendations. By the end of the year there was marked improvement in the operation of the Marshall Boulevard Municipal Plant.

The City has approximately six hundred auto vehicles, including fire-fighting apparatus, and the matter of repairs on these machines has assumed a greater magnitude than was first considered. All shop and machine work on repairs at all pumping stations and bridges are also handled by this Plant.

To handle this large and important work will require a considerable additional properly constructed floor space. The location and all other matters pertaining thereto are included in the recommendations referred to.

To make the Marshall Boulevard Municipal Plant complete to handle all required work of the City in a desired and profitable manner there will be required an additional expenditure for changes, extensions and equipment the sum of approximately $400,000.

MUNICIPAL SHOPS DIVISION

FRANK MILLER, Superintendent of Shops.

During the year 1919, the Municipal Shops Division received 8,919 orders and requisitions for labor and material, covering as many jobs, for the various departments, bureaus and divisions of the City government. The work done was distributed between departments and bureaus as follows:

Police Department	3,861 Jobs
Fire Department	809 Jobs
Construction Division	1,162 Jobs
Pipe Yards and Stores Division	756 Jobs
Pumping Stations	776 Jobs
Water Pipe Extension Division	442 Jobs
Bureau of Streets	259 Jobs
Bureau of Sewers	94 Jobs
Stock	447 Jobs
Miscellaneous	313 Jobs

Apparatus repairs and overhauling by jobs for the different departments, bureaus, etc., was as follows:

Police Department.	628	Patrols.
	119	Ambulances.
	260	Fords and touring cars.
	2,462	Motor driven apparatus by the traveling mechanics.
	53	Minor station repairs.
Fire Department.	6	Trucks remodeled.
	15	Trucks overhauled.
	120	Engines.
Pipe Yards and Stores Division.	680	Trucks.
Bureau of Sewers.	55	Eductors repaired and overhauled.
Bureau of Streets.	139	Trucks.
	4	Oilers.
	15	Tar Wagons.
	40	Flushers.

The output of the Municipal Foundry consisted of the manufacture of the following castings:

	4834	Curbs, lids, gutter boxes, etc.,	weighing	1,121,290 lbs.
	82	6" to 12" Special Castings	weighing	16,881 lbs.
	45	16" to 24" Special Castings	weighing	25,149 lbs.
	33	36" to 48" Special Castings	weighing	149,503 lbs.
	25770	Miscellaneous Iron Castings	weighing	43,662 lbs.
Total	30764	Iron Castings made	weighing	1,777,609 lbs.
	12629	Brass, Aluminum, etc., Castings	weighing	43,622 lbs.
Total	43393	Castings	weighing	1,821,231 lbs.

52 Hydrants were repaired for the Water Pipe Extension Division and the following special Castings made:

Number	Casting	Weight
50	8 x 6 Tees	10,900 lbs.
100	6 x 6 Tees	16,600 lbs.
30	8 x 4 Tees	6,630 lbs.
2	48 x 24 Tees	10,760 lbs.
20	3 inch C. I. Sleeves	720 lbs.
20	16 inch C. I. Sleeves	5,660 lbs.
12	3"—⅛ C. I. Circle Bends	720 lbs.
25	4"—¼ C. I. Circle Bends	2,250 lbs.
100	8 inch C. I. Plugs	2,600 lbs.
2	48 x 48 Tees	16,266 lbs.
1	48 x 36 Tees	6,764 lbs.
1	24 x 24 Tees	1,640 lbs.
3	16 x 8 Tees	2,070 lbs.
6	48 inch Sleeves, long	13,770 lbs.
6	24 inch C. I. Sleeves 24 inches long	4,386 lbs.
25	4"—⅛ C. I. Circle Bends	1,750 lbs.
3	24"—¼ C. I. Circle Bends	4,179 lbs.
10	16"—⅛ C. I. Circle Bends	4,800 lbs.
6	24"—⅛ C. I. Circle Bends	7,650 lbs.
25	12"—⅛ Bends	6,675 lbs.
1	24"—¼ Bends	1,393 lbs.
2	16"—¼ Bends	1,270 lbs.
3	48"—⅛ Bends	15,588 lbs.
7	36"—⅛ Bends	22,043 lbs.
9	16"—¼ Bends	5,715 lbs.
25	8 to 6 Reducers	3,675 lbs.
3	36 x 24 Reducers, Large Bell	4,560 lbs.
2	36 x 24 Reducers, Small Bell	3,040 lbs.
2	36 x 24 Reducers, No Bell	3,040 lbs.
12	16 x 12 Reducers, Large Bell	4,572 lbs.
2	16 x 12 Reducers, Small Bell	762 lbs.
6	48 x 36 Reducers, Large Bell	26,172 lbs.
18	8 inch C. I. Off Sets, 2 feet	5,346 lbs.
3	48 x 48 Crosses	28,791 lbs.
3	48 x 36 Crosses	22,146 lbs.
	Total	274,903 lbs.

24 New Hydrants, 430 8-inch Valves and 5 16-inch Valves were manufactured and delivered the Division of Pipe Yards and Stores.

6 New Standard Hook and Ladder Trucks with all equipment were built and turned over to the Fire Department.

The following Extra Equipment was manufactured and delivered the Fire Department:

22—20-foot, 26-foot, 30-foot and 36-foot Straight Ladders
8—50-foot Bangor Ladders
10—65-foot Bangor Ladders
56—6-foot, 8-foot, 10-foot, 12-foot and 14-foot Roof Ladders
182—Pike Poles

Turbo Generator No. 3 of the Municipal Power Plant was completely overhauled.

51 Disintegrator Cages were repaired and 2 Drums for garbage crusher were made for the Municipal Reduction Plant.

For the Discharge Piping of the 40 MC Motor Driven Centrifugal Pump at the 68th Street Pumping Station, the following were made:

	Lbs.
1—36-foot Automatic Control Valve, weighing	10,500
1—SE 107—36-foot Elbow, weighing	3,600
1—SE 103A—36-foot Elbow, weighing	2,900
1—SE 107A—36-foot Bend, weighing	3,700
1—SE 103—36-foot Special Bend, weighing	2,460
1—SE 102 Sealing Tank, weighing	1,860
2—SE 105 Sealing Tank Tops, weighing	420

Turbines were overhauled, gear cases made, and approximately 100,000 lbs. of Grate Parts made for the 68th Street Pumping Station.

Six Dumpers and Frames were made for Boilers 5, 6 and 7 at the 68th Street Pumping Station, weighing 10,500 lbs.

Patterns were made for Riedler Valves for the Chicago Avenue and Lake View Pumping Stations, and 48 Riedler Valves were refaced and repaired for these stations.

Work Done at the Municipal Pier: Extended aprons on roof garden seams, repaired conductor heads, repaired copper roof on dome and dancing pavilion, relaid all glass, except circles, over dancing pavilion, took off and extended caps, relaid all glass in 3 skylights above toilet rooms, repaired bars and gutters of same, also gutters on terminal, erected and re-erected downspouts on east end of head house, put 24 feet of new gutters, repaired copper decks on head house, made 20 new signs for doors, put an extension and covers on terminal sheds, and repaired downspouts and gutters on north freight sheds.

Work performed and billed during the year, not including jobs in course of completion, follows:

Fire Department, Repairs, etc.	$124,235.54
Police Department, Repairs, etc.	82,580.71
Water Pumping Stations, Repairs, etc.	120,246.94
Sewer Pumping Stations, Repairs, etc.	3,586.31
Bureau of Streets, Repairs, etc.	8,005.90
Bureau of Sewers, Repairs, etc.	7,198.18
Bureau of Waste Disposal, Repairs, etc.	21,729.17
Construction Division, Repairs, etc.	41,323.59
Pipe Yards and Stores Division, Castings	45,452.64
Pipe Yards and Stores Division, Miscellaneous	33,216.65
Pipe Yards and Stores Division, Hydrants	5,969.73
Pipe Yards and Stores Division, Valves	17,353.91
Water Pipe Extension Division, Miscellaneous	13,935.65
Water Pipe Extension Division, Hydrant Repairs	2,601.18
Municipal Power Plant, Repairs, etc.	3,214.55
Board of Education, Repairs, etc.	399.57
Bureau of City Hall, Repairs, etc.	1,291.07
Municipal Pier, Repairs, etc.	2,649.67
Department of Gas and Electricity, Repairs, etc.	1,321.70
Government Work	3,036.45
Miscellaneous Divisions, Bureaus and Departments, Repairs, etc	4,573.72
Gas, Janitor and Telephone Service	2,698.48
Total	$546,621.31

There was also uncompleted work not billed amounting to $10,762.12, and stock made up but not billed, as follows:

Rough Iron Hydrant and Valve Parts	$ 4,478.45
Rough Brass Hydrant and Valve Parts	7,907.44
Finished Iron Hydrant and Valve Parts	5,714.14
Finished Brass Hydrant and Valve Parts	4,912.73
Fire Department Castings	952.04
Miscellaneous Castings	736.46
Brass and Bronze Bushings, Stock	1,023.61
Chlorine Apparatus	2,769.50
Curbs and Lids, etc	14,882.38
Total	$43,376.75

The grand total of all work done by the Municipal Shops, during the year 1919, was $600,760.18.

DIVISION OF PIPE YARDS AND STORES

WILLIAM SAYRE, General Foreman.

YEAR 1919

This year shows a decrease in the amount of business done in the Division of Pipe Yards and Stores, with an increase in operating costs. The latter was due principally to increase in salaries of the Division employes, and increase in maintenance of trucks, which, because of their age, needed many repairs.

For material delivered and truck service rendered, we made warrants for collection totaling $774,806.95, analyzed as follows:

Material	
$463,583.83, 15 per cent overheard	$ 69,537.61
22,245.73, 3 per cent overhead	666.37
68,834.83, no overhead	0
$554,664.39	$ 70,203.98
	554,664.39
	$624,868.37
Truck service billed	149,938.58
Grand Total	$774,806.95

There has been an increase in truck service, as compared with former years, another reason for increase in cost of operation. For truck service rendered no overhead is charged, nor has there been any charge for storage, consequently no revenue is derived from these items.

The following statement details the total amount billed:

Construction Division	$ 88,553.06
Bridge	.43
Bureau of Parks	349.27
Bureau of Gas and Electricity	2,200.66
Harbor Board	114.65
Bureau of Waste Disposal	234.07
House of Correction	10,195.77
Fire Department	5,042.97
Police Department	23,420.14
Municipal Shops	26,418.98
Operating Division	78,761.20
Rivers and Harbors	7,814.47
Bureau of Sewers	17,248.71
Bureau of Streets	4,775.07
Testing Division	1,092.93
Water Pipe Extension	462,601.74
Water Meter Shops	23,832.93
Bureau of City Hall	723.34
Miscellaneous	4,944.83
Contractors	16,481.73
	$774,806.95

By comparing the above with the report for 1918, the instances in which our business has fallen off may be seen. In but four cases has it increased. They are the business with the Construction Division, Water Meter Shops, Municipal Shops, and the Bureau of Parks. We are of the opinion that with full co-operation the volume of our business would be increased considerably, as the material carried in the Pipe Yards and Warehouse is of such varied nature that we are able to sell needed commodities to almost every department of the City. In addition to this line of business, we furnish truck service and messenger service, also storage facilities in our spacious fire-proof Warehouse.

The cost of operation of the Division has been analyzed as follows:

Supervision	$ 12,900.00
Office force and watchmen	12,573.95
Laborers	28,150.08
Laborers (borrowed from other divisions)	2,380.08
Motor truck drivers and garage man	98,747.17
Hired trucks—by day	15,542.37
Hired trucks—by contract	5,004.53
Privately owned auto	936.65
Hauling material between Pipe Yards	1,950.46
Material used from stock by Pipe Yards	248.25
Printing specifications and advertising for bids	1,225.49
Inspection of elevators and scales	58.52
Plumber, steamfitter, and electrician—Pipe Yards	650.91
Demurrage charged	96.36
Equipment, and repairs to same	188.10
Heat, hot water, light, and power—Pipe Yards	5,087.45
Inspections and tests of material	6,028.69
Phones—Pipe Yards	1,206.39
Stamps and stationery	698.09
Miscellaneous	568.78
Heat, light, hot water, etc.—Garage	1,846.29
Rent for outside garages	996.00
Plumber and steamfitter—Garage	196.45
Phones—Garage	57.00
Gasoline and motor oil	14,349.15
New tires	7,253.50
Truck repairs and miscellaneous supplies	36,514.75
Total cost of operation	$255,455.46

Percentage cost of operation: $\frac{255,455.46}{704,602.97} = .3625$

We unloaded 159 cars of material and made 14,187 deliveries.

During the latter part of the year much time was consumed in re-arranging the vast stock of material at the Warehouse, with a view to facilitating its stocking and handling. This work is yet under way. Changes have been made in the methods of receiving and delivering material, resulting in increased efficiency.

WATER METER SHOPS

FRANK D. ANDERSON, General Meter Foreman

With an average monthly force of 46.8 employes in office, shop and field there were performed 36,196 jobs of repairs, replacements and installations of water meters at a cost of $17,135.61 for supervision and clerk hire; $57,998.54 for mechanics and laborers, and $16,068.56 for cartage, a total of $91,202.71 and $80,420.59 for meters, meter parts and material.

As a reimbursement for expenditures made for overtime work and installation of emergency and fire meters, etc., there was billed to consumers the amount of $2,327.50, of which $1,464.13 represented work done by deposits.

The average cost of maintenance per meter, $3.42.

The revenue collected by the Bureau of Water from meter service was greater than any preceding year, being $4,303,025.01—an increase of $376,957.44 over 1918.

There were 2,603 new meters installed. Of this number 71 replaced smaller services.

The total number of meters in service December 31, 1919, was 27,532.

STATEMENT OF REPAIRS AND REPLACEMENTS

FIELD WORK

Description of work performed	No. of Jobs	Labor Cost	Material Cost	Hire of Trucks	Totals	Average Cost
Investigations	1,669	$ 1,484.13	....	$ 1,169.91	$ 2,654.91	$ 1.59
Meters removed permanently	284	347.10	$ 9.13	194.97	551.20	1.90
Meters repaired on premises	5,616	6,073.00	261.24	4,809.66	11,143.90	1.98
Meter locations changed	1	8.78	46.61	4.20	59.59	59.59
Meters replaced	4,434	7,843.25	2,805.57	6,462.77	17,111.59	3.86
Cost of new meters	......	....	8,972.15	....	8,972.15	......
Leaks repaired	73	131.85	38.61	97.48	267.94	3.67
Meters removed for safekeeping	176	243.13	4.12	259.96	507.21	2.90
Maintenance of auto trucks	......	1,704.43	....	....	1,704.43	......
Supervision and clerk hire	......	6,311.77	....	....	6,311.77	......
Totals	12,253	$ 24,147.44	$ 12,137.43	$ 12,998.95	$ 49,283.82	$ 4.02

SHOP WORK

Description of work performed	No. of Jobs	Labor Cost	Material Cost	Hire of Trucks	Totals	Average Cost Per Job
Meters tested before repairs	41	$ 37.48	....	....	$ 37.48	$ .91
Meters tested and sealed after repairs	4,070	1,852.97	$ 156.92	....	2,009.89	.49
Meters repaired in shop	4,014	17,526.28	2,793.84	....	20,320.12	5.06
Meter parts rehabilitated	6,898	3,869.97	912.22	....	4,782.19	.69
Material rehabilitated	1,091	99.17	1.98	....	101.15	......
Repairs and replacement to equipment and apparatus	......	629.05	78.71	....	707.76	.09
General work	......	9,256.81	....	....	9,256.81	......
Supervision and clerk hire	......	7,117.53	....	....	7,117.53	......
Totals	16,114	$ 40,389.26	$ 3,943.67	....	$ 44,332.93	$ 2.70

STATEMENT OF CONSTRUCTION AND BETTERMENTS

FIELD WORK

Description of work performed	No. of Jobs	Labor Cost	Material Cost	Hire of Trucks	Totals	Average Cost
Meters installed	2,603	$ 3,634.03	$ 5,582.60	$ 3,069.61	$ 12,286.24	$ 4.72
Cost of new meters	......	....	58,593.85	....	58,593.85	......
Maintenance of autos	......	405.67	....	....	405.67	......
Supervision and clerk hire	......	989.65	....	....	989.65	......
Totals	2,603	$ 5,029.35	$ 64,176.45	$ 3,069.61	$ 72,275.41	$ 27.76

SHOP WORK

Description of work performed	No. of Jobs	Labor Cost	Material Cost	Hire of Trucks	Totals	Average Cost Per Job
Meters tested and sealed (new).	4,752	$ 1,107.85	$ 163.04	....	$ 1,270.89	$ 0.27
General work	......	1,106.66	....	....	1,106.66	......
Supervision and clerk hire	......	606.56	....	....	606.56	......
Totals	4,752	$ 2,821.07	$ 163.04	....	$ 2,984.11	$ 0.27

SUMMARY

Description of work performed	No. of Jobs	Labor Cost	Material Cost	Hire of Trucks	Totals
Repairs and replacements, field	12,253	$ 24,147.44	$ 12,137.43	$ 12,998.95	$ 49,283.82
Repairs and replacements, shop	16,114	40,389.26	3,943.67	....	44,332.93
*Special extraordinary expense	474	2,747.03	....	....	2,747.03
Construction and betterments, field	2,603	5,029.35	64,176.45	3,069.61	72,275.41
Construction and betterments, shop	4,752	2,821.07	163.04	....	2.984.11
Totals	36,196	$ 75,134.15	$ 80,420.59	$ 16,068.56	$ 171,623.30

*This item includes scrapping old meters amounting to $212.18; vacations and time off voting, $2,534.85 of which $2,277.70 is repairs and replacements and $257.15 construction and betterments.

STATEMENT OF NET COST OF MAINTENANCE PER METER
And Net Cost of Installation Per Meter
1919

REPAIRS AND REPLACEMENTS

Total salaries and wages for repairs and replacements	$67,026.58
Total cost of material for repairs and replacements	16,081.10
Total cost of truck hire for repairs and replacements	12,998.95
Total	$96,106.63

CREDIT

Total amount billed for labor and material in repairing meters	1,863.37
Total net cost of maintenance	$94,243.26
Average net cost per meter	$ 3.42

NOTE.—Average net cost of maintenance is derived by taking the total net cost of maintenance and dividing by total number of meters in service December 31, 1919.

CONSTRUCTION AND BETTERMENTS

Total salaries and wages for construction and betterments	$ 8,107.57
Total cost of meters installed during the year	58,593.85
Total cost of material used in installing 2,603 meters	5,745.64
Total cost of truck hire	3,069.61
Total	$75,516.67

CREDIT

Total amount billed for meters, labor and material installing 36 private meters: Labor, $572.83; material, $382.15; meters, $509.15	1,464.13
Total net cost of installation	$74,052.54
2,603 meters installed (2,567 City owned and 36 private meters).	
Average cost City owned meters used in installations	$ 22.63
Average cost of material to install 2,567 City meters	2.09
Average cost of labor to install 2,567 City meters	2.94
Average cost of truck hire to install 2,567 City owned meters	1.20
Total cost per meter	$ 28.86

This does not include labor and material used by Plumbing Shop, Water Pipe Extension Division, installing 2,487 meter connections of ¾-inch to 2-inch, inclusive, on which meters were installed during the year.

STATEMENT OF METERS AND SIZES OF NEW METERS

Installed and Meters removed permanently during the Year 1919

	⅝-in.	¾-in.	1-in.	1¼-in.	1½-in.	2-in.	3-in.	4-in.	6-in.	8-in.	10-in.	Alarm Valve	Total
New meters installed	2	206	1796	....	384	135	33	25	12	5	2	3	2603
*Per cent permanent removals	19	71	94	6	29	33	17	8	5	2	....	....	284

*Included in these numbers are 71 meters removed from service on account of larger service pipes and meters installed.

TYPES AND SIZES OF WATER METERS IN SERVICE

December 31, 1919

	⅝-in.	¾-in.	1-in.	1¼-in.	1½-in.	2-in.	3-in.	4-in.	6-in.	8-in.	10-in.	12-in.	Total
Keystone	242	301	273	152	266	414	50	66	12	....	....	....	1,776
Pittsburg	62	107	288	....	275	151	46	18	9	....	....	....	956
Penn Disc	18	22	28	....	37	59	....	....	....	....	....	....	164
Eureka	....	....	....	....	5	63	18	22	31	10	2	....	151
Hersey Disc	38	27	45	....	41	21	8	3	....	....	....	....	183
Hersey Rotary	8	13	11	....	50	69	56	46	22	....	....	....	275
Hersey Torrent	....	....	....	....	....	4	62	95	68	12	3	1	245
Lambert	62	117	290	....	61	256	....	....	....	....	....	....	786
Thomson	4	1	....	....	3	1	....	3	....	....	....	....	12
Crown	562	26	40	....	43	39	19	32	4	....	....	....	765
Nash	34	26	375	....	51	17	2	2	....	....	....	....	507
Empire	3	4	4	....	2	2	1	....	....	....	....	....	16
Union	3	....	....	....	....	....	....	....	....	....	....	....	3
Gem	....	....	....	....	....	6	2	9	19	11	....	1	48
Niagara	5	4	2	....	2	3	....	....	....	....	....	....	16
American	51	....	14	....	142	9	....	....	....	....	....	....	216
Trident Disc	74	31	31	....	15	256	71	20	2	....	....	....	900
Trident Crest	....	....	....	....	....	4	236	181	86	27	9	1	544
Badger	71	239	174	....	192	191	....	....	....	....	....	....	867
Worthington Plunger	267	13	54	....	245	267	195	....	....	....	....	....	1,041
Worthington Disc	618	2,584	8,893	600	2,923	1,884	56	58	9	....	....	....	17,625
Worthington Turbine	....	....	....	....	....	4	71	141	110	38	7	8	379
Gem-Empire	....	....	....	....	....	....	1	6	....	....	....	....	7
Trident Compound	....	....	....	....	....	....	2	2	....	....	....	....	4
Total	2,522	3,515	10,522	752	4,353	3,720	896	704	372	98	21	11	27,486

Automatic Meter Alarm Valves	18
Hydraulic Elevator Dials	18
Fire Valves	9
Total	27,532

COMPARATIVE TABLE OF SUMMARIES

1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918 and 1919.

YEAR	Number of meters in service	Meter rates collections	Increase in meter rates collections	Number of new installations	Number of permanent removals	Number of meters overhauled in the shop	Number of meters repaired on premises	Number of meters relocated	Number of meters tested	Total net cost of installation	Total net maintenance	Average cost of maintenance per meter
1909......	14,883	$2,166,224.52	$ 145,903.41	482	323	3,354	8,168	156	6,024	$62,385.38	$89,750.02	$6.03
1910......	15,032	2,425,735.59	259,511.07	756	607	2,495	8,056	207	7,334	61,965.69	79,219.60	5.26
1911......	16,628	2,556,594.32	130,858.73	1,141	400	3,765	5,197	89	7,532	40,501.84	78,713.23	4.73
1912......	16,052	2,877.379.90	320,785.58	422	248	3,973	6,821	16	8,207	14,211.83	71,560.29	4.45
1913......	16,969	3,028,232.72	150,852.82	1,197	280	3,522	6,389	5	6,323	30,386.64	67,455.71	3.97
1914......	18,474	3,020,437.84	* 7,794.84	808	294	3,921	6,572	5	5,751	36,021.07	65,966.42	3.57
1915......	19,439	2,761,367.60	* 259,070.28	1,250	285	3,523	5,892	5	8,577	36,209.20	66,949.68	3.44
1916......	20,768	3,081,158.08	319,790.48	1,615	286	3,169	5,502	2	6,323	41,465.79	91,534.40	4.40
1917......	22,729	3,512,364.30	431,206.22	2,198	317	4,303	5,287	1	5,631	58,624.00	70,599.86	3.15
1918......	25,421	3,926,067.57	413,703.27	2,929	237	4,763	4,926	2	8,258	68,812.93	76,625.17	3.03
1919......	27,532	4,303,025.01	376,957.44	2,603	284	4,014	5,616	1	8,863	74,052.54	94,242.36	3.42

*Decrease.

DESIGNING DIVISION

MYRON B. REYNOLDS, Engineer of Water Works Design.

MAYFAIR PUMPING STATION.

Plans were completed for the street lighting system, lawn sprinkling system, dust exhauster for coal crusher room, chlorine cylinder stands, engine governor changes and preliminary plan for 60 million gallon turbine-driven centrifugal pump.

LAKE VIEW PUMPING STATION.

Plans were made for boiler and setting for replacing Nos. 4 and 5 Sederholm boilers with one 650 H. P. Edgemoor boilers with underfeed stoker. Plans were made for necessary structural changes due to the above installation.

CHICAGO AVENUE PUMPING STATION.

Plans were completed for new building, tunnel changes, electrical work, and all other work incidental to installing two 50 M. G. motor-driven centrifugal pumps.

CENTRAL PARK AVENUE PUMPING STATION.

Plans were completed for railway trestle into storage yard for coal.

SPRINGFIELD AVENUE PUMPING STATION.

Plans were completed for the changes in piping, due to the changes in the locations of the boiler feed pumps and heaters. Preliminary plans were made for the installation of new pumping engines. Various plans were made for such as platforms for operating valves, roof changes, etc.

HARRISON STREET PUMPING STATION.

Plans were completed for new roof and roof trusses for the boiler room Plan was completed for new hub for flywheel on No. 1 Allis pump.

TWENTY-SECOND STREET PUMPING STATION.

Plans were completed for electrical work in connection with installation of new 25 M. G. motor-driven centrifugal pumps; supports for discharge pipes; automatic priming devices, and curb around wet well to protect pit from surge.

FOURTEENTH STREET PUMPING STATION.

Drawing completed for screen to be placed in shaft to protect the suction pipes of all engines.

SIXTY-EIGHTH STREET PUMPING STATION.

Plans were completed for changes in the settings of the four south boilers; for necessary building changes, and for foundations, piping, etc., for the installation of the two 40 M. G. motor-driven centrifugal pumps. Plans were completed for line room, bus compartments, transformer layouts and all electrical work in connection with installation of the motor-driven pumps. Drawings were made for the necessary changes in the suction shafts, with overflows to provide against surge.

WILLIAM HALE THOMPSON PUMPING STATION.

Preliminary plans and studies were made for this station. The station is to be 300 M. G. capacity. The pumping equipment will be composed of four 25 M. G. vertical, triplex-expansion pumping engines and four 60 M. G. turbine-driven centrifugal pumps.

MARSHALL BOULEVARD MUNICIPAL PLANT.

Plans were made for changes in the heating system in order to better distribute the heat. General plans and estimates were made for the rearrangement of floor space and additions to buildings for the purpose of enlarging the plant.

MUNICIPAL REDUCTION PLANT.

Plans were completed for the steam power piping and boiler room auxiliaries and accessories.

TUNNELS AND CRIBS.

Plan was completed for concreting deck of breakwater at the 68th Street Crib.

Plans were revised for the extension of the South-West Land Tunnel and drawings made for the construction plants for the shafts at Wood Street and at 61st and Western Avenue.

Preliminary plans were made for a new crib and for the extension of the Two-Mile Tunnel System.

Plan was made for extension of Michigan Avenue Water Pipe Tunnel.

TESTS.

Men were furnished for the test of the boilers at Mayfair Pumping Station, and for a trial test of the 40 M. G. motor-driven pump at 68th Street Pumping Station.

MISCELLANEOUS.

Bids for work were tabulated and contractors' plans were checked as received.

Organization charts were made for different divisions of the Bureau of Engineering.

Drawings were made for the construction plant at Roosevelt Road.

TESTING DIVISION

L. S. MARSH, Engineering Chemist in Charge.

During the year of 1919, the work of the Testing Division was somewhat increased over that of the previous year, this being due to the fact that a greater volume of construction work was carried on, necessitating the sampling and testing of materials and the inspection of new equipment. The distribution of the work for the various departments, bureaus and divisions as well as certain contracts under the supervision of the City is well shown in the following itemization of warrants issued for collection:

Bridge Division	$12,135.87
City Engineer	389.45
Bureau of City Hall	151.36
Construction Division	5,009.36
Department of Electricity	4.13
Fire Department	9.90
Department of Health	35.20
Board of Local Improvements	6,736.29
Municipal Shops	650.41
Municipal Tuberculosis Sanitarium	170.49
Operating Division	5,736.95
Pipe Yards and Stores	5,888.12
Bureau of Rivers and Harbors	28.60
Water Supply Investigation	1,631.38
Bureau of Waste Disposal	629.56
Water Pipe Extension	66.05
	$39,273.12
Special assessment pipe, inspection	837.85
Union Station Company	1,369.00
Board of Education	2,247.03
	$43,727.00

It should be noted that apparatus and chemicals to the amount of $1,672.87 were purchased during the year of 1919, and these purchases charged against the capital account, and the allowance of 10 per cent for supervision remains insufficient to take care of the purchases of supplies and materials, the amount allowed being barely sufficient to cover strictly supervisory expenses.

COAL.

Nine hundred and seventy-two (972) laboratory tests of coal were made during the year of 1919, these tests representing somewhat more than 3,600 individual samples. As the testing of coal and other supplies for the Board of Education was handled by the Testing Division during 1919, the number of coal samples was consequently greatly increased and attached tabulation gives the prices earned for the coal delivered to the various pumping stations and other power plants of the city.

Some new equipment has been added in the laboratory to facilitate the crushing and grinding of coal samples, resulting in a larger volume of work and a reduction in time for the laboratory sampling.

OIL.

Lubricating oil was largely purchased in tank cars during the year just passed, these totaling eleven, five of which were cylinder oil and six engine oil. The total number of tests made on lubricating oils was eighty-one (81). Considerable work has been done in the laboratory looking toward the more complete testing of steam turbine oils in order to obtain sufficient data to use in specifications.

CEMENT.

Cement sampled and tested during the year of 1919 totaled 24,018 barrels, of which only 300 barrels was natural cement. A great deal of this cement was sampled at the mill at Buffington, Ind., but owing to the difficulty in obtaining continuous deliveries of cement from the mill, several thousand barrels were sampled in various warehouses throughout the city.

CAST IRON WATER PIPE.

The amount of pipe inspected and shipped during the year of 1919 was largely increased over the previous year, a total of 15,630 pieces of various sizes of pipe having been inspected, of which 5,068 pieces or 32.4 per cent were rejected. The total weight of pipe shipped, including pipe for special assessment work, was 8,691 tons.

LUMBER.

Inspection of lumber at the yards of contractors in Chicago and on various construction jobs necessitated the continuous use of an inspector on this work, with the result that during the year 840 individual inspections were made, covering 175,309 pieces or 2,683,329 board feet.

It should be noted that out of all this material very little complaint was made of the receipt of inferior lumber on any of our construction jobs.

CREOSOTED TIMBER.

The amount of structural timbers, paving blocks and piling inspected by this Division during the year of 1919 was very large. The total board feet of structural timbers inspected and treated amounted to 764,280. Paving blocks totaled 3,302 square yards and oak piling 53,120 lineal feet. A considerable amount of structural timber was rejected, the total being 27,168 board feet, while 2,430 lineal feet of oak piling was also rejected. The above material was used on the following bridges:

Lawndale Avenue, Lawrence Avenue, Kimball Avenue,
Franklin-Orleans and North Michigan Avenue.

INSPECTION.

The inspection of treatment of structural timbers and paving blocks requires the services of one man continuously for practically the whole year and it is a cause of satisfaction to know that the quality of the work has been greatly improved and the equipment at creosoting plants largely increased because of pressure from the Field Inspector on this line of work.

Inspection work carried on during the year of 1919 was not as great in volume as that of the year previous, due to the fact contracts had been held in abeyance pending more suitable conditions for the letting of same. Inspection work included the following:

Wells Street Bridge.—Structural steel, mill tests and shop fabrication, machinery and timbers.
Michigan Avenue Bridge.—Structural steel, mill tests and shop fabrication, machinery and timbers.
Franklin-Orleans Street Bridge.—Mill and shop inspection as well as erection and painting.
Addison Street Bridge.—Inspection of the fabrication of steel at Milwaukee, Wis.
Kimball Avenue Bridge.—Mill tests and shop inspection at Canonsburg, Pa.
Chicago Union Station.—Inspection of erection of all structural iron work.
Chicago Avenue Pumping Station.—Inspection of 42-inch strainers at Pittsburgh, Pa., and centrifugal pumps at Trenton, N. J.

CORPORATION FERRULES.

The contract for corporation ferrules for 1919, as well as the contracts for roundway cocks, required inspection at Newark, N. J. and Springfield, Mass. These contracts were both nearly completed on contract time.

SHUT-OFF BOXES.

Ten thousand (10,000) shutoff boxes under contracts were inspected and shipped to the warehouse at 3150 South Sacramento Avenue, being completed well within the required time.

A number of miscellaneous inspections and investigations were conducted during the year, such as feed water heater, electric fuses, water meters, pipe covering, chlorine control apparatus, etc.

MISCELLANEOUS TESTS.

There were handled in the laboratory during the year of 1919, exclusive of coal and oil, 346 miscellaneous samples, a list of these being given below:

79 tests cast iron
2 tests pig iron
1 test Soot Burno
15 tests turbine oil
3 tests transformer oil
3 tests linseed oil
2 tests fuel oil
16 tests bronze
14 tests corporation ferrules
16 tests paint
1 test white lead
1 test Non-freeze solution
1 test sand
8 tests electric tape
1 test coke
2 tests nickel steel
3 tests solder
3 tests tin
1 test spelter
11 tests reinforcing bars
1 test water
17 tests rags
11 tests library paste
22 tests pipe covering
18 tests varnish
1 test metal polish
2 tests steel
1 test scrap iron
8 tests gasoline
1 test carborundum
3 tests compressor oil
2 tests grease
5 tests floor oil
6 tests brass
1 test Litnum bronze
1 test metal for chlorine regulating valve
12 tests lead pipe
1 test paint remover
1 test calcium chloride
3 tests Babbitt metal
8 tests pig lead
1 test oak timber
1 test concrete
5 tests pump valves
6 tests copper
1 test aluminum
1 test granite blocks
1 test feed water piping
13 tests soap
7 tests washing powder
1 test oak wood
1 test turpentine
1 test sewer pipe
2 tests slag

The Testing Division has at the present time a furnace for the testing of fire brick which is nearly completed and it is intended to make tests on a large variety of fire brick to determine the relative merits of such brick as come into this market. Fire clay is also under investigation, with the same purpose in view and it is hoped that information may be obtained which will provide for the more satisfactory purchase of these materials.

AVERAGE ANALYSIS AND AVERAGE PRICE PAID FOR TESTED COAL

DELIVERED TO PUMPING STATIONS AND POWER PLANTS

During the Year 1919

	Percent Moisture	Percent Del. Ash	Dry B. T. U.	Price Earned	
Central Park Avenue					
Nut	8.0	9.3	12,936	$4.2021	1919 Contract
Screenings	9.1	10.8	12,674	3.8735	1918 Contract
Screenings	9.3	12.7	12,283	3.6321	1919 Contract
Chicago Avenue					
Lump	10.4	9.1	12,826	5.0185	1918 Contract
Lump	8.8	8.7	12,866	4.456	1919 Contract
City Hall					
Nut	6.0	9.7	12,744	5.1682	1918 Contract
Nut	8.5	8.4	12,613	4.6147	1919 Contract
Screenings	11.3	12.4	12,449	4.222	1919 Contract
Fourteenth Street					
Lump	10.7	9.7	12,918	4.8813	1918 Contract
Lump	8.8	8.7	12,984	4.4995	1919 Contract
Lump or Egg	8.0	8.1	13,574	4.6213	1919 Contract
Harrison Street					
Nut	9.7	9.2	12,964	4.9640	1918 Contract
Nut	9.8	11.5	12,438	4.3026	1919 Contract
Screenings	9.1	11.5	12,438	4.3309	1919 Contract
Lake View					
Nut	8.3	10.8	12,698	5.2003	1918 Contract
Nut	7.3	12.2	12,335	4.5417	1919 Contract
Egg	7.3	16.1	11,944	4.3854	1919 Contract
Lump	10.0	15.8	11,834	4.2097	1919 Contract
Mayfair					
Nut	8.6	10.3	12,836	3.7178	1919 Contract
Screenings	9.4	12.1	12,133	3.6876	1918 Contract
Screenings	8.7	14.6	12,135	3.2658	1919 Contract
Roseland					
Screenings	11.8	18.6	11,527	3.3711	1918 Contract
Screenings	9.9	17.3	11,828	4.2375	1919 Contract
Nut	7.4	10.5	12,835	4.1704	1919 Contract
68th Street					
No. 1 Screenings	9.0	11.8	12,518	3.7597	1918 Contract
No. 1 Screenings	8.4	12.4	11,912	3.7238	1919 Contract
Nut	8.0	9.5	13,444	4.378	1919 Contract
Springfield Avenue					
Screenings	9.0	13.6	12,132	3.6130	1919 Contract
Nut	7.9	9.0	12,963	4.166	1918 Contract
Nut	7.2	10.1	12,666	4.177	1919 Contract
22nd Street					
Lump	10.1	8.4	12,921	4.054	1918 Contract
Lump	11.1	14.1	11,952	3.3450	1919 Contract

AVERAGE ANALYSIS AND AVERAGE PRICE PAID FOR TESTED COAL

Delivered to

SEWAGE STATIONS

	Percent Moisture	Percent Del. Ash	Dry B. T. U.	Price Earned	
Kensington					
Mine run....................	9.2	9.2	12,935 car delivery	$3.625	1919 Contract
Mine run....................	9.2	9.2	12,935 team delivery	4.564	1919 Contract
95th Street					
Mine run....................	8.5	17.4	11,328 car delivery	3.239	1919 Contract
Mine run....................	8.7	17.8	11,135 team delivery	3.985	1919 Contract
Stony Island					
Mine run....................	11.5	12.4	12,346 car delivery	3.537	1919 Contract
Mine run....................	12.1	10.4	12,674 team delivery	4.391	1919 Contract
MUNICIPAL REDUCTION PLANT					
Screenings.......................	10.4	13.7	11,997	3.5894	1918 Contract
Screenings.......................	9.7	14.1	12,034	3.225	1919 Contract
MUNICIPAL POWER HOUSE					
Nut..............................	8.2	12.9	12,463	3.638	1919 Contract
Screenings.......................	9.9	19.1	11,365	3.3954	1918 Contract
Screenings.......................	10.2	15.0	11,968	3.1518	1919 Contract
No. 2 Screenings.................	10.7	27.3	9,736	2.475	1919 Contract
MUNICIPAL TUBERCULOSIS SANITARIUM					
Screenings.......................	9.8	14.9	12,084	4.2195	1919 Contract
BRIDEWELL CREMATORY					
Screenings.......................	10.0	12.7	12,322	3.4089	1919 Contract

DIVISION OF BRIDGES

THOS. G. PIHLFELDT, Engineer of Bridges

The city owns and maintains 50 movable and 26 fixed bridges and inspects 48 viaducts owned by railroad companies.

Expenditures during the year were—repairs $325,000 and construction of new bridges and viaducts $1,906,000.

During the year Monroe Street and Lawrence Avenue bridges were completed and work started on Kimball Avenue, Addison Street and Lawndale Avenue bridges. Construction was delayed two months on account of labor trouble.

BRIDGE DESIGNING SECTION

HUGH E. YOUNG, Engineer of Bridge Design

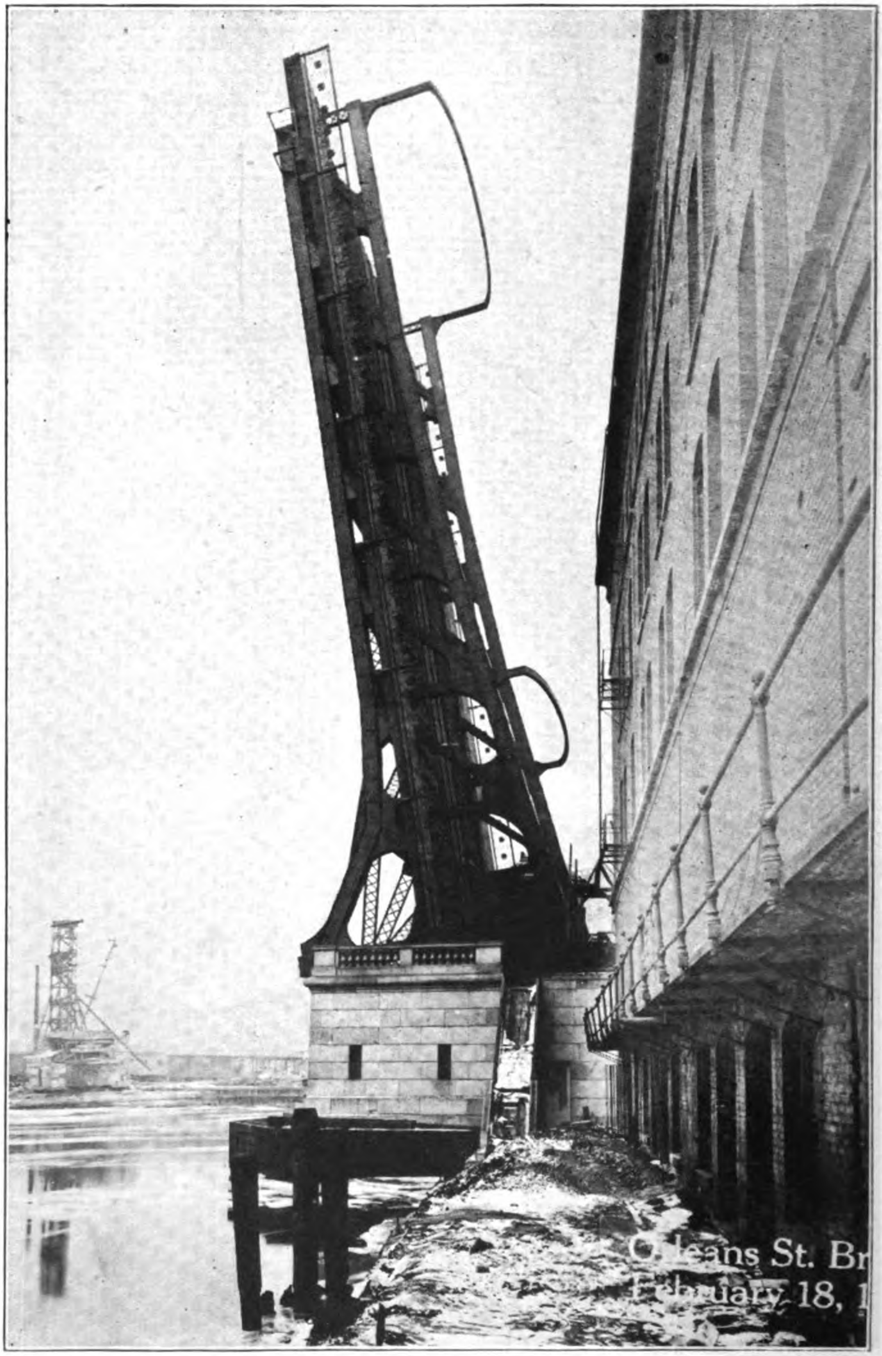
During the year 1919 the time spent on the preparation of preliminary and final plans, estimates and specifications for bridges, viaducts and public improvements was as follows:

	Per cent of Total Time
Roosevelt Road Bridge (formerly Twelfth Street)	28.9
Madison Street Bridge	23.4
Roosevelt Road Viaduct (east of the river)	16.2
Wells Street Bridge	13.5
Kinzie Street Viaduct (checking final plans)	5.0
Michigan Avenue Improvement (checking shop plans)	4.7
Addison Street Bridge (checking shop plans)	1.0
Monroe Street Bridge (checking shop plans)	1.0
Franklin-Orleans Bridge	3.8
Franklin-Orleans South Approach	
Franklin-Orleans North Approach	
Adams Street Bridge	
California Avenue Bridge (analysis of competitive designs)	
Ogden Avenue Improvement (preliminary studies)	
South Water Street Improvement (preliminary studies)	
Miscellaneous work	2.5
Total	100.0

ROOSEVELT ROAD BRIDGE.

In the latter part of the year 1918, the old design for the Roosevelt Road Bridge (formerly 12th Street) calling for a direct lift span supported on four ornamental steel towers, was definitely abandoned. One of the principal reasons for this was that considerable opposition developed to the adoption of the vertical lift type of bridge, which was considered ponderous and unsightly as compared with the bascule type of bridge, which can be treated architecturally, so as to give a very pleasing looking structure similar to the present Jackson Boulevard Bridge.

Preliminary studies and layouts were started for a new design, namely—a single leaf single deck trunnion bascule bridge spanning the present channel, with provisions made to allow turning the superstructure on its foundations to span the proposed new channel and locating the substructure for either position of the leaf so as not to obstruct the railroad tracks. These studies, stress diagrams and preliminary layouts were continued through the first half of the year 1919,



FRANKLIN-ORLEANS STREET BRIDGE—SOUTH LEAF after which the final contract plans were started for the substructure, superstructure, operators' houses, enclosure walls and electrical equipment. These were all well advanced at the end of the year. Simultaneously with this work the specifications and final quantity and cost estimates were prepared, with a view of advertising this improvement for bids during the first part of the year 1920.

The new design will be far superior to the direct lift type of bridge from an engineering point of view as to first cost of construction and future maintenance.

WEST MADISON STREET BRIDGE.

The final plans for the substructure, superstructure, operators' houses, enclosure walls and electrical equipment of the latest design for a double leaf trunnion bascule bridge at W. Madison street were nearly completed at the beginning of the year. It later developed that it would be feasible to provide for the erection of this structure without any serious interruption to traffic by modifying the design. A Council order was passed to incorporate this feature in the final plans for the bridge, which necessitated a complete revision of the substructure and superstructure drawings, as it required the moving of the east abutment 8 feet 8 inches from its former position to permit of the construction of the cofferdam east of the clearance line of the present east draw.

The revised plans were practically completed and checked in the latter part of the year and the substructure contract was advertised and let November 28, 1919. The remaining time was devoted to minor revisions on the plans and to the checking of architectural details in order to have the design meet with the requirements of the Chicago Plan Commission, the Municipal Art Committee of the A. I. A. and the Art Commission of the City of Chicago.

ROOSEVELT ROAD VIADUCT (East of the River).

In accordance with the general re-design of the Roosevelt Road Improvement (formerly 12th street), the preliminary plans for which were approved in 1918, the viaduct structure east of the river was to be of reinforced concrete beam and slab type. The design embodied many unusual engineering features, which called for more than the usual time and skill in making the calculations and preparing detail plans.

In general the structure was designed as a series of monoliths 200 to 250 feet long. This required that the strictest attention be paid to the effect of temperature stresses as well as to the stresses due to moving loads.

A feature of the design was the cantilevered portions of the roadway outside of the columns, which tended to reduce the stresses in the center of the roadway. This required careful analysis of stresses for the various conditions of loading.

Difficulty was encountered in the design of the viaduct structure in providing proper clearance over railroad tracks and still be able to design girders shallow enough to prevent raising the proposed grade of the viaduct.

At the State street crossing there are a series of three continuous arches, the center ones over the roadway having a span of 60 feet. The outside arches over the sidewalks were designed to act with the center arches and in that way reduce the stresses to permit a very shallow depth of the center arches. The shallow construction was necessary in order to get the proper clearance without raising the viaduct grade. In view of the many unusual conditions, the reinforcing for most of the members was designed in detail so as to facilitate the construction.

In addition to the general design plans for the Roosevelt Road Viaduct, it was also necessary to prepare all the detail construction plans, such as temporary trestles, form work, etc., in order to facilitate the work of the Construction Division, who were building this structure. On account of the monolithic features of this design it was necessary to co-operate with the construction engineers to the end that the actual construction would be carried out in accordance with the assumptions made in the design.

During the year the designing, detailing, tracing and checking of the plans were well advanced and studies and engineering reports for betterment in design of the Clark street approaches were completed.

WELLS STREET BRIDGE.

While the construction work on the substructure for the double deck double leaf bascule bridge at N. Wells street was well advanced, and the superstructure contract was let at the beginning of the year, there was a considerable amount of engineering work required for this improvement in checking shop plans and revisions.

The major portion of these revisions was due to the changes in design of the operators' houses, railings, and enclosure walls, made in order to carry out the recommendations of the Art Commission of the City of Chicago. These changes also involved a complete revision of the specifications so as to permit the erection of operators' houses and enclosure walls under separate contract.

The construction work on the bridge was being carried out without serious interruption to traffic, including surface cars and elevated trains, which called for close co-operation between the Designing Section and the field forces in checking the contractor's plans for temporary supports, to insure public safety and to avoid any unnecessary delays to traffic, even of short duration.

At the end of the year the plans and specifications for the electrical equipment of this bridge were completed and the contract let.

KINZIE STREET VIADUCT.

The viaduct to be built at Kinzie street betwen the river and the west line of Orleans street was designed for the flat slab type of construction with an alternative design for a concrete encased steel type for which complete plans were made in the year 1918.

This viaduct is 80 feet wide and 770 feet long and is to be constructed by the Chicago Union Station Company under the supervision of the City engineers.

In the course of the preparation of plans for this viaduct a certain number of difficulties had to be overcome, one of which was the interference of the Chicago Tunnel Company's tunnel with the center columns. The center columns were carried on reinforced concrete substructure beams spanning the tunnel. These beams were supported by sub-piers of 4-foot span sunk on either side of the tunnel walls.

The alternate sets of plans and specifications for both the steel and concrete types were all revised to comply with the request of the Chicago Union

Station Company, who decided to change from concrete to wooden piling for the retaining wall at Orleans street.

MICHIGAN AVENUE IMPROVEMENT.

Contractors' shop plans for the twelve separate contracts of the Michigan Avenue Improvement were checked. In addition to this work considerable engineering work of a general nature was done, such as inspection of the field work at the bridge site and on the approaches, trips to the American Bridge Company's plant at Gary, Indiana, in order to pass on steel and machinery before it is shipped, and the co-ordination of the work of the various contractors so as to avoid delays or interferences.

CHECKING PLANS ON THE CHICAGO UNION STATION PROJECT.

In connection with the work of checking design and detail plans on the Chicago Union Station Project, it was found necessary to devote a good deal of time to the analysis of the Roosevelt Road Viaduct design plans for structure between Canal street and the river. These plans were checked with respect to the following features: Stresses with assumptions based on City's standard specifications; clearances over railroad tracks; grades as established by City ordinances; provision for public utilities; details in a general way to agree with requirements of the City and the Chicago Plan Commission.

During the year about 50 per cent of this work was completed.

OGDEN AVENUE IMPROVEMENT.

Preliminary general plans were made for the Ogden Avenue Improvement, showing the location, grades and main features of construction. This was supplemented by a number of preliminary estimates giving a comparison of cost between the viaduct built of structural steel, or one of reinforced concrete, also the cost of the approaches and depressions.

It was intended to use these preliminary studies during the coming year as material for a more complete survey of the improvement and for drawing up general plans for the following bridges:

1. A bridge over the North Branch of the Chicago River at Ogden Avenue.
2. A bridge over the North Branch Canal at Ogden Avenue.
3. Raising the present Division Street Bridge and constructing new operators' houses.
4. Raising the present Halsted Street Bridge and constructing new operators' houses.

ADAMS STREET BRIDGE.

Preliminary studies were made for the new bridge at Adams Street. This structure will be of the double leaf deck type of trunnion bascule bridge similar to the Jackson Boulevard span. Layouts were made for determining the clear channel for navigation and flow for sanitation which were tentatively approved by the U. S. Government.

Layouts were also made of the west abutment enclosure walls, so as to have the bridge work connect architecturally with the Union Station work at this location.

MISCELLANEOUS WORK.

Engineering work of a general nature was done in checking shop plans, revising plans on contracts under construction and making investigations and writing reports on the following bridges, viaducts and improvements:

Franklin-Orleans Street Bridge and Approaches—
Checking shop plans for the bridge and making final plans and specifications for the south and north approaches.

Monroe Street Bridge—
Checking shop plans.

Lawrence Avenue Bridge—
Checking shop plans and revising plans for lighting equipment.

Union Station Project—
Checking and approval of detail plans for the Polk Street, Canal Street and Taylor Street viaducts and checking revisions for the Harrison Street Bridge.

Addison Street Bridge—
Revisions of plans and specifications on lighting and ornamental work.

Clark Street Bridge—
Sketches were made for the approval of the Art Commissioner of the City of Chicago.

La Salle Street Bridge—
Picture plans were submitted to the Art Commissioner.

Preliminary Studies
made on the S. Crawford Avenue Viaduct, Cicero Avenue Bridge, Robey Street Bridge, N. Ashland Avenue Bridge and the S. Water Street Improvement.

South California Avenue Bridge—
An analysis was made and report prepared on the competitive designs submitted by the Scherzer Rolling Lift Bridge Company, the Strauss Bascule Bridge Company and the Strobel Construction Company to the Sanitary District of Chicago for a bridge over the canal at S. California Avenue.

GENERAL.

Tables were prepared showing cost and time distribution on plans and specifications for City bridges and viaducts.

Information on quantities of materials and costs of City bridges was submitted to the courts, relative to the Strauss patent suit against the City of Chicago.

PROGRESS OF WORK.

The bridge and viaduct designing program as outlined for the year 1919 was not fully carried out, due primarily to the diversion of time to additional work not contemplated at the beginning of the year, and also to the inability to fill all vacancies with experienced designers for this class of work.

CONSTRUCTION SECTION

CLARENCE S. ROWE, Engineer Bridge Construction

The following summary shows the construction work done by contract during the year 1919:

Due to strikes, a lockout of the various trades, and a general feeling of unrest in industrial circles, the work done on bridge construction contracts during the year did not reach the anticipated amount. The lockout caused a complete cessation of operations during a large portion of the most favorable season of the year for this class of construction.

Two bridges were completed and opened to traffic during the year, namely the Monroe Street Bridge over the South Branch of the Chicago River and the Lawrence Avenue Bridge over the North Branch of the Chicago River.

FRANKLIN-ORLEANS STREET TRUNNION BASCULE BRIDGE.

The substructure on the south side of the river was completed during the year 1918.

During January, 1919, the site of the north main piers and tail pit was dredged to a depth of about —22.0 feet C. D.

The removal of the cofferdam used in connection with the construction of the substructure on the south side of the river was completed February 11, 1919. With the construction of the south pier protection the substructure on the south side of the river was completed March 6, 1919.

The driving of the piles and sheeting to form the walls of the cofferdam used in connection with the construction of the north main piers, tail pit and abutment was commenced February 3, 1919, and completed April 3, 1919. The bracing for the north cofferdam was framed floating within the cofferdam and forced down into position by added weight.

The excavation for the sub-piers on the north side of the river was commenced June 9, 1919. These sub-piers were completed July 11, 1919.

A six inch layer of concrete was placed in the north main pier footings and tail pit floor July 17, 1919.

On July 18th all work was suspended on account of a lockout of the trades by the contractors. The lockout was terminated and work on the substructure was resumed September 22, 1919.

The north main piers and tail pit were completed December 6, 1919. At the end of the year the substructure was completed with the exception of the removal of the north cofferdam and the construction of the pier protection and docks on the north side of the river.

The north main piers, tail pit side walls and floor slab, and the north abutment, constructed of reinforced concrete, were supported on the sub-piers carried down to hard grubbing clay mixed with pebbles and boulders at an elevation of about —67.0 feet C.D. The sub-piers were belled at their bases to secure adequate bearing surface. The distance from face to face of the river piers of 220 feet gave an absolutely clear channel 210 feet in width for the passage of vessels.

The structural steel for the south leaf was delivered by rail on the north side of the river and transferred to the south side by scows.

On March 11, 1919, the first structural steel was erected on the south piers.

The erection of the south leaf was completed, the operating machinery and electrical apparatus were installed and the leaf lowered to a horizontal position for the first time September 22, 1919. At the end of the year the south leaf was completed, with the exception of the placing of the wearing surface on the roadway; the placing of a small amount of counterweight, and the completion of the painting of structural steel and machinery.

The operator's house, balustrades, stairways, pylons, etc., on the south side of the river, were constructed of granite and terra cotta and were practically completed at the end of the year.

The fabrication of the structural steel for the north leaf was completed.

The installation of the electrical equipment kept pace with the work on the superstructure.

Mr. Carl O. Johnson, Assistant Engineer, was in local charge at this bridge.

WELLS STREET DOUBLE DECK TRUNNION BASCULE BRIDGE.

Wells Street Bridge was the first bascule bridge so designed as to permit erection without interrupting street traffic and without the use of a temporary bridge to secure this result. This was a radical departure and meant the continued use of the street by the public for a period of about two years required to build the new structure. The additional cost was much less than would have been required to build the enormously expensive temporary bridge at this site.

The plans provided for the support of both decks of the old draw span and the approaches on false work during the construction of the new bridge.

The specifications stipulated that the movable portion of the new bridge should be erected in the raised position and that certain portions of the floor system of both decks be temporarily omitted to allow the passage of the elevated road cars and the street cars over the old bridge during the construction of the superstructure. According to the specifications for the superstructure 72 hours was allowed for the aggregate sum of interruption of elevated railroad traffic and an interruption of the street traffic was permitted for a period of two months.

The sub-piers on the north side of the river were completed during the year 1918. The north main piers and tail pit were completed April 22, 1919. The north abutment was constructed as far as the presence of the old structure permitted May 31, 1919. The permanent longitudinal and cross girders were placed on the north piers.

The substructure on the north side of the river was completed July 14, 1919.

The north end of the old draw span and the south end of both decks of the north approach were temporarily supported on steel girders which rested on piles driven outside of the limits of the new work. Both decks of the north approach back of the bridge seat were supported on false work. The temporary supports were left in place for use by the contractor for the superstructure.

Practically no work was done from July 18 to September 22, 1919, on account of a lockout of the various trades. The first work on the south side of the river was performed September 27, 1919, and consisted in the removal of old sidewalks, etc., which interfered with the new work.

A steel girder was placed just north of the location of the new south abutment to support the roadway during the construction of the substructure.

The second bent of the elevated railroad structure south of the old bridge was supported on timber cribbing and I beams.

The construction of the walls of the cofferdam on the south side of the river was commenced October 6, 1919, and completed December 2, 1919.

The south line of the old center pier protection was moved back to maintain the original width of the south draw during the presence of the south cofferdam.

During the construction of the substructure elevated railroad and street traffic over the old bridge was maintained with the following interruptions:

The bridge was closed to all street and elevated railroad traffic and the bridge swung to an open position between the hours of 1 a. m. and 4:45 a. m. each day from October 17 to November 1, 1919, inclusive, with the exception of October 19, 1919, to permit the removal of the north cofferdam and the driving of the south cofferdam within the area covered by the old drawbridge, and between the hours of 1 a. m. and 4:45 a. m. each day November 7, 8, 11, 12 and 13, to permit the driving of protection clumps in the north draw and the dredging of the north draw.

During the remodeling of the lower deck on the south approach the street was closed to vehicular traffic only, one roadway at a time, and caused very slight inconvenience to the public. The excavation for the sub-piers at the south abutment and south anchor piers was commenced December 30, 1919.

The contract for the superstructure was awarded June 26, 1919. Due to the strike in the mills the delivery of steel to the bridge shop was delayed and no steel was fabricated.

Mr. Frank A. Berry, Assistant Engineer, was in local charge at this bridge.

LAWRENCE AVENUE BRIDGE (Fixed Span).

At the beginning of the year the substructure was completed, with the exception of the construction of the sidewalks, curbs and macadam pavement on the approaches. Practically no work was done on the substructure from January 1 to March 23, 1919, owing to unfavorable weather conditions.

The macadam pavement on the portions of the approaches covered by the substructure contract was completed April 12, 1919. With the construction of the sidewalks and curbs on the approaches, the substructure contract was completed May 13, 1919. The erection of the superstructure was commenced January 6, 1919, and completed April 16, 1919.

The street car tracks were placed on the span and approaches by the Chicago Surface Lines. The first street car passed over the new bridge at 9:15 a. m., April 17, 1919. The new bridge was opened to all street traffic at 9:30 a. m., April 28, 1919, utilizing the pavement in the street car company's right of way on the approaches. The temporary bridge was removed by the Construction Division, Bureau of Engineering.

The pavement outside of the street car right of way on the major portion of both approaches was under reserve to the Board of Local Improvements. This pavement was originally creosoted block, but owing to the increased gradient due to the construction of the new bridge a sandstone block pavement was substituted to secure greater tractive effect. The sandstone block pavement was completed June 25, 1919. This was the first long approach laid in sandstone instead of the customary granite. This sandstone has been shown to wear down uniformly and not round off or cobble. It has been used successfuly on long and steep grades in the City of Milwaukee.

This bridge consisted of three deck girder spans 237 feet 6 inches from center to center of end bearings, so constructed as to allow the removal of the center or channel span, if necessary, to allow the passage of dredges, pile driver, etc.

The bridge proper, with a width of 65 feet over all, provided a roadway 38 feet in width and two sidewalks each about 13 feet in width. The roadway on the approaches was constructed 42 feet in width and two cement sidewalks 6 feet wide were placed on the entire length of the approaches. Under a separate contract the approaches were embellished by the construction of four decorative concrete pylons and railings and the electric lighting system for the pylons was installed. The entire improvement, covering a distance of about 800 feet along Lawrence Avenue, was completed August 25, 1919.

KIMBALL AVENUE BRIDGE (Fixed Span).

Work on the contract for the substructure and superstructure of this bridge was commenced May 15, 1919.

The south abutment and portions of the retaining walls on the south approach were well under way when lockout of the trades was inaugurated July 18, 1919. Work was resumed September 8, 1919.

The retaining walls of the south approach were completed October 7, 1919, and both abutments were completed October 31, 1919. The erection of steel was commenced October 17, 1919, and the span was completed, with the exception of the placing of the creosoted block pavement and the hand railing. Ornamental concrete railings were constructed at each end of the bridge.

The bridge consisted of a deck girder span 40 feet in width and 74 feet 2 inches center to center of bearings. A roadway 24 feet in width and two sidewalks about 8 feet in width were provided. The abutments were constructed of reinforced concrete and rested on foundation piles driven to about —19 feet C. D. The filling on the north approach was practically completed, except that portion just back of the north abutment. The dock on the north side of the river was completed.

ADDISON STREET BRIDGE.

Work on the substructure was commenced June 2, 1919. The work of constructing the approaches to the temporary bridge and the construction of the retaining walls on both approaches to the new bridge progressed until July 18, 1919, when the lockout of trades took effect. Work was resumed September 22, 1919. The approaches and bridge seats at the temporary bridge were completed.

The old span was closed to all street traffic at 8 a. m., October 6th, and the decking was removed. The old span was transferred to the temporary bridge just north of Addison Street by means of a scow and landed on the new supports at 7 p. m., October 8, 1919. The temporary bridge was opened to traffic October 10, 1919.

Foundation piles were driven for both abutments. The placing of concrete in the west abutment was commenced November 18, 1919, and the abutment was practically completed, except the coping, December 31, 1919.

The excavation at the site of the east abutment was completed. The driving of steel sheeting in the cofferdam at the west river pier was commenced December 9, 1919, and practically completed at the end of the year. A large percentage of the structural steel for the superstructure was fabricated.

Mr. R. B. Sullivan, Assistant Engineer, was in local charge of this bridge.

LAWNDALE AVENUE BRIDGE (Pile Trestle) West Fork.

Work on the contract for a pile and timber trestle was commenced November 10, 1919. A section of the new trestle was constructed just east of the old bridge and this section was opened to traffic December 11, 1919. The old bridge was removed; the pile and timber bents in the balance of the new trestle were completed.

Some of the stringers and sub-planking were placed on the westerly section of the new trestle.

Mr. F. B. Umstot, Assistant Engineer, was in local charge at this bridge.

MADISON STREET TRUNNION BASCULE BRIDGE.

Work on the substructure was commenced December 4, 1919. The sewer on the east side of the river was diverted to the south of the new work. Certain parts of the machinery and the sprinkling system in the Central Union Building, which interfered with the construction of the construction of the sub-piers to support the walls of the building, were removed and reinstalled in other positions.

Part of the south wall of the east cofferdam was driven and the driving of steel sheeting to form the walls of the west cofferdam commenced.

Mr. Carl O. Johnson, Assistant Engineer, was in local charge at this bridge.

MONROE STREET TRUNNION BASCULE BRIDGE.

This bridge was constructed by the Chicago Union Station Co., under the direction of the Department of Public Works. With the exception of a few minor details the superstructure and electrical equipment were completed at the beginning of the year. The operators' houses of granite and terra cotta were finished. The temporary electrical apparatus was reinstalled in a permanent position in the operators' houses. A stairway was constructed leading to the deck just south of the east piers.

The installation of the electric lighting system for the pylons was completed.

This bridge, of a trunnion bascule type, consisted of two leaves with a distance of 192 feet 9⅛ inches from center to center of trunnions and a width over all of 60 feet. Two 60 H. P. motors were installed for the operation of each leaf. A roadway 36 feet in width and two sidewalks each 9 feet in width were provided. The length of steel work over all from abutment to abutment was 262 feet.

A clear river channel 165.5 feet was provided.

This bridge formed a new connecting link between the loop district and the west side of the river and materially relieved the traffic congestion in adjacent thoroughfares.

The work of constructing the east approach from Market Street to the bridge was performed by the Construction Division, Bureau of Engineering, under the supervision of the Bridge Division of the same bureau. At the beginning of the year the east abutment and the south retaining wall were completed. The north retaining wall was completed February 14, 1919.

The sidewalks were constructed as reinforced concrete slabs supported by reinforced concrete columns and beams. The construction of the north sidewalks necessitated the remodeling of the sprinkler system in the basement and sub-sidewalk space of the Selz, Schwab & Co. building at the northwest corner of Monroe Street and Market Street.

The filling between the retaining walls was placed and the temporary granite block pavement was completed February 20, 1919. The east approach was completed April 23, 1919.

The Chicago Surface Lines constructed the street car tracks on the bridge and approaches. The bridge was dedicated and opened to traffic Washington's Birthday, February 22, 1919, by the Hon. William Hale Thompson, Mayor.

ROOSEVELT ROAD TRUNNION BASCULE BRIDGE.

Preliminary work in connection with the new bridge was commenced February 5, 1919. The sub-piers at the east abutment were completed, with the exception of one sub-pier, in the excavation of which considerable difficulty was experienced on account of water breaking through and flooding the excavation. A cofferdam was driven extending south from the old east abutment and enclosing the south end of the site of the new abutment. Nine sub-piers were carried down to rock at elevations varying from —59 to —61 feet, C. D.

In connection with the construction of the east dock, the concrete anchorage and the dock rods were placed. The piles and Wakefield sheeting to form the dock south of the old viaduct were driven. Work on the west dock was commenced September 29, 1919, and about 90 per cent of the anchorage was finished. The piles for that section of the dock north of the old viaduct were driven.

The construction of the temporary ramp leading south from Roosevelt Road to the railroad yards west of the river was commenced August 2, 1919, and was about 85 per cent completed at the end of the year. This work was done by the Construction Division, Bureau of Engineering, under the direction of the Bridge Division of the same bureau.

Mr. H. B. Anderson, Assistant Engineer, was in local charge of this work.

ROOSEVELT ROAD VIADUCT.

The construction of the substructure of the viaduct between Wabash Avenue and the South Branch of the Chicago River was commenced March 18, 1919.

Of the 154 sub-piers in Roosevelt Road 150 were completed. Capitals and sub-columns were constructed on 55 of the sub-piers. The sub-piers were carried down to rock, which was found at elevations varying from —56 feet to —62 feet, C. D. Underground reinforced concrete girders were completed at bents Nos. 21 and 26.

In connection with the superstructure six columns near State Street were constructed and forms erected for sections of viaduct between bents Nos. 6 and 9, between bents Nos. 12 and 13 and between bents Nos. 15 and 17. The construction of the permanent east approach was commenced July 12, 1919, and practically completed, with the exception of the permanent pavement, during the year. A temporary timber trestle was constructed to connect the north half of the new east approach to the old viaduct west of State Street. The old viaduct from the abutments between State Street and Wabash Avenue to the west line of State Street was removed.

At the intersection of Roosevelt Road and State Street the underground ties between the arches were constructed in the south half of the street and the temporary pavement outside of the street car right of way was placed at the new grade. The work was done by the Construction Division, Bureau of Engineering, under the direction of the Bridge Division of the same bureau, and the work totaled $730,000 for the year for both bridge and viaduct.

Mr. H. B. Anderson, Assistant Engineer, was in local charge of the viaduct work.

REPAIR SECTION

F. H. AVERY, Engineer of Bridge Construction and Repairs

The year 1919 was noted for the terrible condition of the bridge floors. This was caused by the failure of the subplanking and further aggravated by a strike of the Chicago Surface Lines' repair forces.

This subplank in many bridges was 10 to 14 years old and due to lack of funds it had been repaired piecemeal until a complete breakdown occurred. During July and August several floors were in such dangerous condition that watchmen were placed to keep teams from falling in the holes in the pavement.

The main cause of this was the design of the street car stringers which gave practically no support to the ends of the subplank. A beginning was made to correct this by using a double stringer with steel castings to carry the street car rail. This design allowed the street car company to remove their rails without disturbing the subplank and gave a firm support to the ends of the plank.

A radical departure was made in pavements. Profiting by the good lasting qualities of the experimental floor on Halsted Street (River) Bridge, a floor was laid on Van Buren Street Bridge consisting of 2-inch by 4-inch and 2-inch by 6-inch oak laid on edge and the grooves so formed filled with asphalt containing 20 per cent emery to render it non-slip.

This was followed by a similar floor at Clark Street and the asphalt laid in a continuous layer 1½ inches over the top of the grooves. Unfortunately this was done in two layers, stopping the first layer at the top of the strips. Crushed granite was rolled in the sheet asphalt surface to render it non-slip. As a result of all this experience a complete floor of this type was laid on Erie Street Bridge. Here the subplank was omitted and the 2-inch by 4-inch and 2-inch by 6-inch laid directly on the stringers. The floor was laid half at a time so as not to interrupt traffic. There was no known formula to figure the strength of this floor, and it was simply guessed at. When the strips were laid and the asphalt truck, weighing 9 tons loaded, backed out on the strips, the deflection was so great that it was feared the truck would break through. The next day when the asphalt was cold a coal truck weighing 14 tons ran over the bridge and the deflection could hardly be noticed.

The south half was laid with 2-inch by 6-inch and 2-inch by 8-inch strips, but no difference could be seen between the two halves as regards deflection.

This floor was original as far as the Bridge Division was concerned, although it afterwards developed that it had been patented 20 years ago. It made a very clean floor, decidedly water-tight and proof against fires due to surface-dust in hot weather. It was found to be 14 pounds per square foot lighter than the standard floor of 6-inch by 12-inch subplank and 3½-inch paving. Erie Street Bridge floor cost 82 cents per square foot and a standard floor $1.55

The larger repairs made in 1919 and spans painted were as follows:

Bridge and Description of Work.	Cost.
Van Buren Street Bridge, Reflooring	$31,264.00
Erie Street Bridge, Reflooring	17,035.00
Clark Street Bridge, Reflooring	32,905.00
Taylor Street Bridge, Reflooring (not completed)	18,000.00
Ashland Avenue I. & M. Truss, Reflooring	5,240.00
State Street Bridge, Reflooring	1,496.00
106th Street Bridge, Protection	3,943.00
Ashland Avenue (W. F.) Bridge, Protection (not completed)	9,370.00
Cortland Street Bridge, Sidewalks	1,212.00
Halsted Street (Canal) Bridge, Sidewalks	1.429.00
Canal Street Bridge, House Rebuilt (not completetd)	3,300.00
Throop Street, Rewire Bridge Houses (not completed)	3,517.00
Washington Street, 1 Coat Red Lead	4,635.00
Erie Street, 1 Coat Red Lead	5,600.00
*Clark Street, 1 Coat Red Lead	6,530.00
Van Buren Street, 1 Coat Red Lead	3,990.00
Archer Avenue, 1 Coat Tocholith	3,219.00
Fullerton Avenue, 1 Coat Elaterite	1,966.00
*South Ashland Avenue (I. & M.) Truss, 1 Coat Tocholith	464.00
Torrence Avenue, 1 Coat Tocholith	1,440.00
*Taylor Street	1,500.00
Signals	3,288.00

VIADUCT SECTION

G. J. STELL, Draftsman.

During 1919 the Viaduct Section had supervision over 37 viaducts and 9 foot bridges. 4 of these are maintained by the City and the remainder by the various railroad companies. A regular semi-monthly inspection was made during the year of all viaducts in the City. 165 notices were issued to the various railroad companies to make repairs and in all cases the work was done as requested.

Construction and major repairs were as follows:

SOUTH CLARK STREET.

Plans for rebuilding this viaduct were approved by the City September 17, 1919, and the steel ordered. The sidewalk was removed October 13, 1919.

WEST 18th STREET.

About 75 per cent of the timber viaduct west of the river was rebuilt by the Pennsylvania R. R. Co. Work was completed August 27, 1919. The girder span east of the river was rebuilt by the C. & A. R. R. Co. Work was completed June 28, 1919.

HALSTED AND KINZIE STREETS.

Plans for the reinforcement of this viaduct were approved by the City Sept. 26, 1919 and Dec. 3, 1919.

JACKSON BOULEVARD BRIDGE.

The decking of the truss span was replaced by the Pennsylvania R. R. Co. Work completed August 9, 1919.

POLK TO TAYLOR STREET.

Extensive repairs are being made to the steel by the B. & O. C. T. R. R. Co. Work is about 90 per cent completed.

WEST ROOSEVELT ROAD.

Timber stringers are being placed under the street car rails by the A. T. & S. Fe Ry. Co. Work is about 80 per cent completed.

The C. & W. I. R. R. Co. temporarily reinforced their truss span. Plans for extensive repairs to this span were approved by the city November 10, 1919.

The paving on the L. S. & M. S. R. R. Co. portion was replaced. Work completed May 13, 1919.

A detailed inspection was made of the following viaducts:

West 18th Street	Pennsylvania R. R.
West Roosevelt Road	A. T. & S. Fe Ry.
West Roosevelt Road	C. & W. I. R. R.
West Roosevelt Road	B. & O. C. T. Ry.
West Roosevelt Road	Penn. R. R.
West Roosevelt Road	C. B. & Q. R. R.
West Polk Street	B. & O. C. T. Ry.
Polk to Taylor Street	B. & O. C. T. Ry.
West Jackson Boulevard	Penn. Ry.
North Dearborn Street	C. & N. W. Ry.
North Sangamon Street	C. M. & St. P. Ry.
North Sangamon Streeet	Penn. Ry.
North Sangamon Street	C. & N. W. Ry.
West Grand Avenue	C. & N. W. Ry.
West Erie Street	C. & N. W. Ry
Halsted Street and Chicago Avenue	C. & N. W. Ry.

INVESTIGATING SECTION

ARTHUR SULLIVAN, Bridge Designing Engineer

ROOSEVELT ROAD VIADUCT AND APPROACHES.

Reports, plans and estimates were prepared covering building damages resulting to abutting property from the construction of this viaduct and its approaches.

Plans were prepared covering the details of construction of sidewalks for this improvement.

Various plans and an interchangeable model were made relative to a connection of State Street with this viaduct. A model was prepared showing the relation of the straightening of the river in conjunction with a new proposed 12th Street Bridge.

FRANKLIN-ORLEANS STREET BRIDGE AND VIADUCT.

Plans, models and reports were prepared and conferences attended relative to securing a settlement with the Union Station Co. of their monetary obligations to the City for benefits they derived from changes in the ordinances covering this improvement.

Plans and reports were prepared covering property to be condemned for the widening of Orleans Street and an alley outlet to Kinzie Street required for this improvement.

Plans and reports were prepared relative to the construction of the south approach to this bridge and permits required for sidewalk privileges.

MONROE STREET AND MADISON STREET BRIDGES.

Assistance was rendered in the preparation of real estate and building reports covering damages to abutting property, resulting from the construction of the east approaches to these bridges.

SOUTH WATER STREET READJUSTMENT.

Plans and reports were prepared relative to the general raising of this street 5-foot above its present level, and assistance rendered in the preparation of real estate and building reports covering damages growing out of this general improvement.

LA SALLE STREET BRIDGE AND APPROACHES.

Plans and reports were prepared relative to the widening of La Salle Street in the vicinity of the street car tunnels both north and south of the river, and assistance was rendered in the preparation of real estate and building reports of damages growing out of this proposed improvement.

MISCELLANEOUS.

Separate maps were prepared which show the location of the various types of bridges along the river and which show the extent and description of dock property occupation. A complete record of Council proceedings pertaining to Bridge Division business, a complete inventory of Bridge Division property, and a complete record of bridge construction contracts were compiled.

Plats were prepared showing abutting property to the various bridge improvements and its ownership.

Assistance was rendered the Corporation Counsel's office in the following damage suits brought against the City:

The White Lumber Co. in relation to the east approach to Webster Avenue Bridge.

Hinckley, Schmidt & Co. in relation to the northwest water tunnel.

John V. Farwell & Co. in relation to a sewer failure in the east approach to the Monroe Street Bridge.

CHICAGO UNION STATION CONSTRUCTION.

The Chicago Union Station District includes the area bounded by Kinzie Street, Roosevelt Road, Canal Street and the Chicago river. All public works constructed by the Union Station Company were under the supervision of this Division.

In the north half of the district little work was done during 1919, except the rearrangement of tracks at Canal and Fulton Streets and the construction of retaining walls around the building at Canal, Randolph and Washington Streets.

Monroe Street temporary viaduct was completed and opened to traffic.

Foundations for the station head house were practically completed and retaining walls were started at the curb lines.

Work was concentrated on the viaduct and track work between Harrison Street and Roosevelt Road, as this was the most congested part of the district. All the viaducts in this district are of reinforced concrete or steel decked construction. In no case is there a long span which requires a truss projecting

Bridge	Contract For
Franklin-Orleans St. Bascule	Substructure
	Superstructure
	Electrical Equip't
Wells St. Double Deck Bascule	Substructure
	Superstructure
	Electrical Equip't
Lawrence Avenue Fixed Span	Substructure
	Superstructure
	Dredging
	Decorative Concrete Elect. Light System
	Approach Pavement
Monroe St. Bascule	Substructure
	Superstructure
	Electrical Equip't
	East Approach
Lawndale Ave. Timber Trestle	Entire Structure
Addison St. Fixed Span	Substructure
	Superstructure
	Decorative Concret Elect. Light System
Kimball Ave. Fixed Span	Substructure and Superstructure
Madison St. Bascule	Substructure
	Superstructure
Roosevelt Rd. Viaduct	....
	....
Roosevelt Rd. Bridge	East Abutment W. Dock & By-Pas

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above the street. To meet this series of short spans and to serve the new freight, express and station facilities, it was necessary to revise the track system of the entire district. This, with the rearrangement of sewers and public utilities necessitated an enormous amount of preparatory work before construction could be started on the viaducts. The track and underground work was 75 per cent completed and work on the streets and viaducts was well under way.

HARRISON STREET.

The present viaduct was moved to a temporary location on the north side of the street; trestle connections were built at the ends and the floor of the west leaf of the river bridge was raised to new grade. The street was closed to traffic less than 2 weeks for this work. This temporary viaduct was built to avoid closing the street during the construction of the permanent viaduct. Foundations for the new structure were 60 per cent completed.

POLK STREET.

Foundations for the structural part of this viaduct were 60 per cent completed.

TAYLOR STREET.

The viaduct was built from Canal Street to the Pennsylvania freight house, connecting with the portion built last year. The west approach from Clinton Street to Canal Street was 90 per cent completed. On account of the dangerous condition of the old viaduct Taylor Street was closed to traffic during the erection of the new structure and every effort was made to hasten the opening of this street.

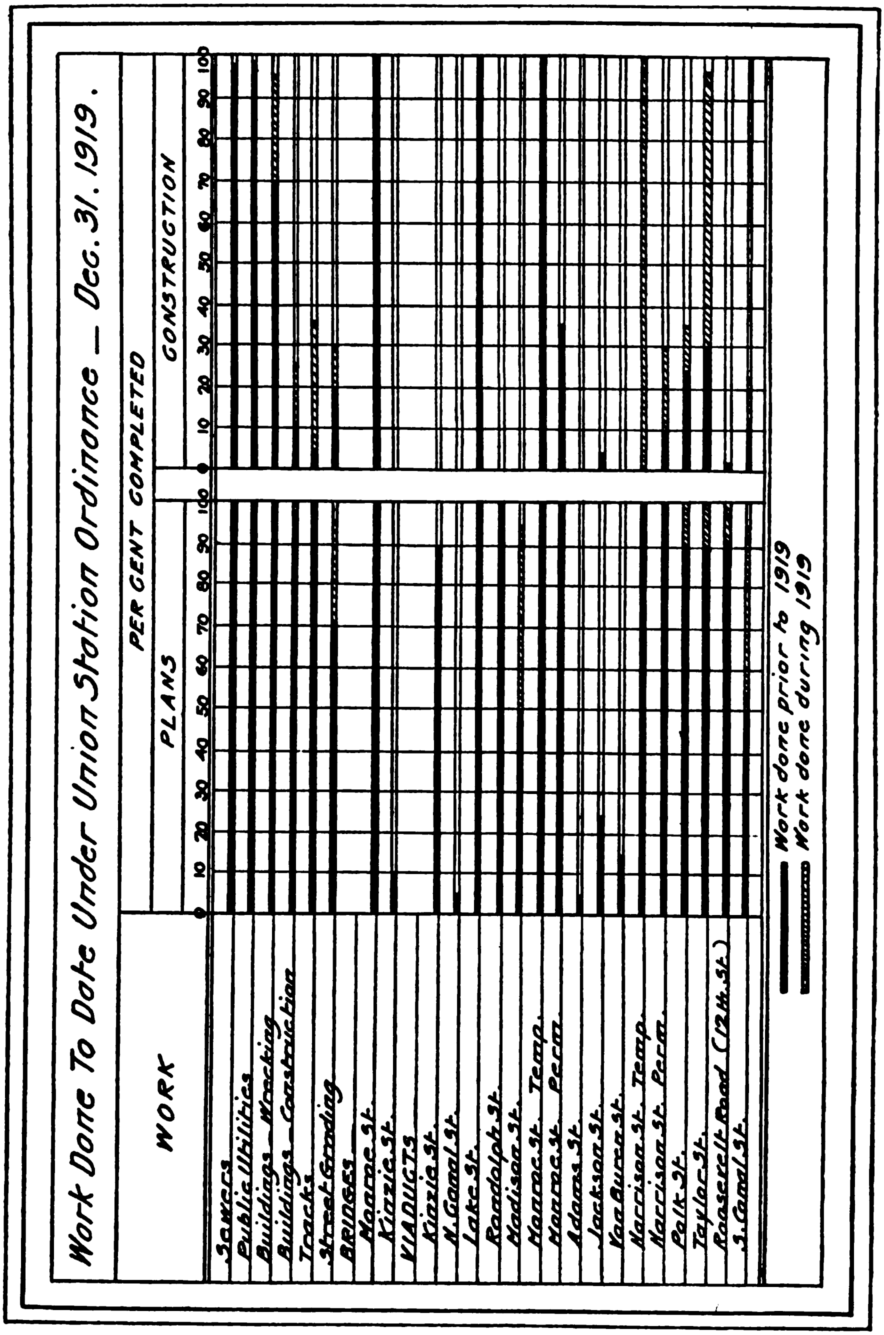
CANAL STREET.

Foundations for the reinforced concrete viaduct between Harrison and Taylor Streets were completed from Taylor to Polk and the superstructure was concreted from Taylor Street half way to Forquer Street. Forquer Street approach to the lower level was completed.

ROOSEVELT ROAD.

A temporary span was built east of the present viaduct to accommodate one track. This was required to permit the relocation of tracks during the construction of the new viaduct piers.

The accompanying chart shows percentages of work completed December 31, 1919.


Work Done To Date Under Union Station Ordinance — Dec. 31. 1919.
WORK
PER CENT COMPLETED
PLANS
CONSTRUCTION
0
10
20
30
40
50
60
70
80
90
100
Sewers
Public Utilities
Buildings Wrecking
Buildings Construction
Tracks
Street Grading
BRIDGES
Monroe St.
Kinzie St.
VIADUCTS
Kinzie St.
N. Canal St.
Lake St.
Randolph St.
Madison St.
Monroe St. Temp.
Monroe St. Perm.
Adams St.
Jackson St.
Van Buren St.
Harrison St. Temp.
Harrison St. Perm.
Polk St.
Taylor St.
Roosevelt Road (12th St.)
S. Canal St.
Work done prior to 1919
Work done during 1919

BUREAU OF WATER

HON. CHARLES R. FRANCIS,
Commissioner of Public Works.

Dear Sir:

I have the honor to submit herewith the annual report of the Bureau of Water for the year ending December 31st, 1919.

COLLECTIONS.

The gross collections amounted to $7,915,008.62, an increase of $417,561.39, or 5.5 per cent over those of 1918.

Of such total, assessed rates furnished $3,428,962.93, an increase of $3,093.29, while meter rates supplied $4,303,025.01, a growth of $376,957.44 for the year.

The collections for water for building purposes amounted to $39,956.35, as compared with $15,257.00 for 1918, and for tap permits to $28,714.00, an increase of $9,921.00 over last year. All other miscellaneous collections amounted to $183,020.68 and was derived from sources as follows:

	1919	1918
Meter Mechanical	$ 1,798.48	$ 1,236.27
Assessor's Miscellaneous	17,341.23	18,029.20
Suspense No. 1 and No. 2	421.93	606.53
Special Deposits	184,745.04	106,842.96

The legally exempted or free water service amounted to $366,171.55, as against $349,889.38 for 1918.

Refunds of duplicate payments and overpayments due to installations of meters during prepaid assessed rates periods, and erroneous assessments occasioned by claims and adjustments covering vacant premises, non-use of hose, altered premises and removed water fixtures amounted to $37,956.64, as against $31,864.67 for 1918 and $32,273.69 for 1917.

Uncollectible bills, amounting to $13,488.54, or 1/6 of 1 per cent of gross collections, were decreased under Council authority for the reason that, while the assessments had to be levied under the ordinance requirements, the claims were not valid, no water having been delivered on account of the premises being vacant, abandoned, wrecked, or used merely as storage places and because of bankruptcy.

On December 31st there was a total of 309,392 accounts comprising the following:

	1919	1918
Assessed Rates	281,501	282,412
Meter Rates	27,740	25,421
Hydraulic Elevators	18	20
Miscellaneous	133	250
Totals	309,392	308,103

The American Railways Express Co. collected and turned over from day to day $1,057,677.92, an increase of $14,896.90 over 1918, and maintained 956 agencies, as against 805 in 1918., This service is efficient and not only provides economy in carfare and time for our customers but promotes economy of space and office hire for the city.

EXPENSES.

The expenses for all purposes pertaining to the assessment and collection of the water rates amounted to $477,295.13, as against $397,157.12 for 1918.

The proportion of total expenses to gross collections amounted to .0604, as against .0529 for 1918.

The average assessed rates bill amounted to $6.09, the cost of assessing the same to $.18-9/10, and the cost of collection to $.17-8/10 per bill.

The average meter rates bill amounted to $18.70, the average cost for assessing to $.57-9/10, and the cost of collecting the same to $.54-1/10 per bill.

The increase is due to extra clerk hire to complete the extra work of skeletonizing 309,392 accounts in the new 1920 to 1922 assessed rates ledgers, the transcribing of the new 1920 to 1924 meter rates and meter mechanical ledgers and of the field books and index cards; to increased salaries and wages on account of the high cost of living; the addition of four new clerks, five rate takers and one rig, and the increased cost of stationery and supplies.

FIELD WORK.

The fifty-one field assessors made and reported 218,647 inspections, served 2,676 hours rate-taking, 2,674 hours in collection division clerical work, and 3,165 hours in assessments division clerical service.

The twenty-two rate takers and two field assessors up to October 17, 1919, and twenty-seven rate takers and one field assessor's part time thereafter made and reported 265,613 meter readings.

The two meter and plumbing examiners inspected 4,463 meters and plumbing systems on complaints of excessive meter bills and the four plumbing inspectors and shutoff men acting as helpers recontrolled 2,008 meters and plumbing systems to locate and stop unauthorized connections.

Twelve shutoff men made 41,496 visits to enforce delinquent payments and to check and report on vacant premises; one shutoff man was maintained ready for turn-ons, pursuant to ordinance requirements, and three shutoff men were used on clerical shutoff work and on floor service and assisting the cashier.

CLERICAL WORK.

Approximately 815,000 bills and vouchers were issued and payments thereof received, receipted, registered, listed, footed, posted and audited; 218,647 reports of field assessors and 265,613 meter readings and reports examined, spread, entered and checked; 200,000 pieces of mail handled; 75,000 delinquency notices made, mailed and checked; 4,000 refund vouchers issued; the monthly transcript of meter charges made; the annual balancing of the 281,500 frontage accounts and back taxes completed; 12,087 meter repair orders issued and reports of repairs entered; 1,783 meter installation orders issued; 4,944 new accounts opened; 2,603 meter certificates and meter control and supplemental certificates issued; 106 special deposits; 646 miscellaneous assessments, 181 water surveys, 463 council claims, 391 council orders for refunds, and the extra work of skeletonizing the 281,500 assessed rates accounts and transcribing of the meter rates and meter mechanical ledgers were handled, together with the details of the connecting work.

The total number of man hours required to complete all field and office work during the year was 448,465, and the average rate of salaries and wages paid per hour amounted to $.60, as compared with $.52 per hour for 1918.

The vitality of the assessed rates revenue during the past five years has been remarkable, considering its growth of $36,289.54 over 1914, in spite of its approximately 11 per cent annual reduction by ordinance, the practical stopping of new accounts through restrictions upon new building construction during and since the war, and the loss of assessed rates accounts due to their transfer to meter control. During the same period, the meter revenue advanced $1,282,587.18, or 42 per cent, while the number of meters increased 9,266, or 50 per cent.

There has been general complaint by employes that the salaries paid are not sufficient to meet the high costs of living and that many of them have had to secure night work to pay their bills. Such condition does not act to promote day work efficiency or the morale of the service.

Yours very truly,

W. J. McCOURT,
Superintendent of Water.

TABLE No. 1—COLLECTION DIVISION

Detailed Statement of Gross Collections by the Bureau of Water during 1919

Months	Assessed Rates	Meter Rates	Meter Mechanical	Assessor's Miscellaneous	Permits	Suspense No. 1	Suspense No. 2	Miscellaneous Revenue	Totals	Special Deposits	Grand Totals
January	$ 482,854.74	$ 300,633.76	$ 40.79	$ 624.82	$ 160.00	$ 9.62	$ 5.88	....	$ 784,329.61	$ 1,563.50	$ 785,893.11
February	508,224.11	319,841.92	127.71	1,253.51	245.00	....	24.67	....	829,716.92	494.06	830,210.98
March	72,952.80	343,614.01	65.04	439.82	418.00	16.96	55.29	....	417,561.92	3,787.00	421,348.92
April	18,670.26	311,056.76	71.13	363.51	2,005.00	3.50	11.21	....	332,181.37	5,127.15	337,308.52
May	186,993.27	355,751.59	176.47	467.64	1,248.00	....	3.61	....	544,640.58	11,959.25	556,599.83
June	416,096.14	331,476.34	100.71	754.26	1,602.00	5.12	65.33	....	750,099.90	16,627.02	766,726.92
July	509,314.61	318,557.43	443.86	891.42	3,563.00	....	43.60	....	832,813.92	30,479.11	863,293.03
August	558,265.80	415,509.70	260.41	1.007.45	2,049.00	....	1.35	....	977,093.71	15,462.76	992,556.47
September	99,409.10	400,025.13	187.27	5,172.13	3,616.00	1.87	15.51	....	508,427.01	6,855.92	515,282.93
October	31,598.72	395,797.07	139.51	2,433.51	3,543.00	3.75	7.79	....	433,523.35	32,373 50	465,986.85
November	153,926.36	403,514.02	132.85	2,157.15	3,929.00	12.40	106.53	....	563,778.31	4,966.65	568,744.96
December	390,657.02	407,247.28	52.73	1,776.01	6,336.00	5.01	22.93	....	806,096.98	5,049.12	811,146.10
Totals 1919	$3,428,962.93	$4,303,025.01	$ 1,798.48	$ 17,341.23	$ 28,714.00	$ 58.23	$ 363.70	....	$7,780,263.58	$ 134,745.04	$7,915,008.62
Totals 1918	$3,425,869.64	$3,926,067.57	$ 1,236.27	$ 18,029.20	$ 18,793.00	$ 152.02	$ 454.51	$ 2.06	$7,390,604.27	$ 106,842.96	$7,497,447.23
Totals 1917	$3,588,455.17	$3,512,364.30	$ 1,047.18	$ 17,970.49	$ 62,473.00	$ 283.10	$ 746.44	$ 13.87	$7,183,353.55	$ 155,624.11	$7,338,977.66
Totals 1916	$3,446,490.69	$3,081,158.08	$ 989.75	$ 21,840.29	$ 41,277.00	$ 185.27	$ 576.90	$ 13.25	$6,592,531.23	$ 79,176.39	$6,671,707.62
Totals 1915	$3,376,350.57	$2,761,367.60	$ 1,462.12	$ 23,926.98	$ 37,524.00	$ 168.40	$ 639.60	....	$6,201,439.27	$ 118,140.31	$6,319,579.58
Totals 1914	$3,392,674.39	$3.020.437.88	$ 1,674.35	$ 25,157.98	$ 38.781.50	$ 25.97	$ 231.77	....	$6.478.983.84	$ 117,671.84	$6.596.655.68

NOTE:—The American Express Company collected 195,261 assessed rates bills, amounting to $1,010,227.06, and the Adams Express Company collected 6,920 bills, totaling $47,450.86. These collections, aggregating $1,057,677.92, were forwarded to the Cashier of the Bureau of Water from time to time during the year within ordinance limitations. The Adams Express Company discontinued collections of water bills on February 1, 1919.

January	88
February	43
March	30
April	57
May	45
June	94
July	92
August	89
September	88
October	50
November	50
December	02
Totals 1919	08
Totals 1918	62
Totals 1917	64
Totals 1916	90
Totals 1915	08
	83

	Special Deposits	Grand Totals
January....	$ 1,563.50	$ 785,893.11
February...	494.06	830,210.98
March.....	3,787.00	421,348.92
April.......	5,127.15	337,308.52
May.......	11,959.25	556,599.83
June.......	16,627.02	766,726.92
July.......	30,479.11	863,293.03
August.....	15,462.76	992,556.47
September..	6,855.92	515,282.93
October....	32,373.50	465,986.85
November..	4,966.65	568,744.96
December..	5,049.12	811,146.10
Totals 1919.	$ 134,745.04	$ 7,915,008.62
Totals 1918.	$ 106,842.96	$ 7,497,447.23
Totals 1917.	$ 155,624.11	$ 7,338,977.66
Totals 1916	$ 79,176.39	$ 6,671,707.62
Totals 1915.	$ 118,140.31	$ 6,319,579.58
Totals 1914	$ 117,671.84	$ 6,596,655.68

NOTE:
bills, totalin
ordinance li

s Company collected 6,920
ime during the year within

167b

WARDS	Balances Jan. 1, 1919
First	$ 3,463.26
Second	3,874.70
Third	2,540.24
Fourth	800.98
Fifth	2,151.30
Sixth	—X—
Seventh	1,919.47
Eighth	2,675.66
Ninth	3,736.76
Tenth	35,176.40
Eleventh	33,764.59
Twelfth	38,551.34
Thirteenth	62,169.28
Fourteenth	50,078.14
Fifteenth	68,274.00
Sixteenth	38,737.92
Seventeenth	42,629.01
Eighteenth	57,352.84
Nineteenth	46,228.81
Twentieth	33,737.00
Twenty-first	49,306.77
Twenty-second	43,272.79
Twenty-third	64,815.83
Twenty-fourth	55,820.72
Twenty-fifth	63,346.15
Twenty-sixth	82,641.36
Twenty-seventh	131,442.48
Twenty-eighth	60,859.49
Twenty-ninth	33,357.58
Thirtieth	17,617.85
Thirty-first	21,628.14
Thirty-second	27,789.31
Thirty-third	96,583.11
Thirty-fourth	81,755.53
Thirty-fifth	90,108.07
Totals 1919	$1,448,206.88

NOTE:—X—Credit B

Detailed St

Months	Asse Ra
January	$ 480,
February	505,
March	69,
April	16,
May	183,
June	413,
July	506,
August	556,
September	96,
October	28,
November	151,
December	388,
Totals 1919	$3,398,
Totals 1918	$3,399,
Totals 1917	$3,564,
Totals 1916	$3,425,
Totals 1915	$3,358,
Tota's 1914	$3,371

NOTE:—The above earnings of $
The refunds, deducted from the gross
$6,695.30; Permits, $393.00; and Met

January...	93.11
February..	10.98
March....	48.92
April......	308.52
May......	599.83
June......	726.92
July......	,293.03
August....	,556.47
September.	,282.93
October...	,986.85
November.	8,744.96
December.	1,146.10
Totals 1919	5,008.62
Totals 1918	7,447.23
Totals 1917	8,977.66
Totals 1916	71,707.62
Totals 1915	19,579.58
Totals 1914	6.655.68

NOTE: … d 6,920
bills, totalin … within
ordinance li

TABLE No. 2—COLLECTION DIVISION

Detailed Statement of Net Collections from all sources during 1919, after deducting Refunds and Special Deposits

Months	Assessed Rates	Meter Rates	Meter Mechanical	Assessor's Miscellaneous	Permits	Suspense No. 1	Suspense No. 2	Miscellaneous Revenue	Contract	Earnings on water used for cement walks	Totals
January	$ 480,931.96	$ 300,457.59	$ 36.90	$ 624.82	$ 160.00	$ 9.62	$ 5.88	$ 9.40	$ 250.00	$ 1,343.71	$ 783,829.88
February	505,677.48	319,621.06	127.71	1,253.51	45.00		24.67				826,749.43
March	69,849.63	343,407.56	65.04	439.82	418.00	16.96	55.29				414,252.30
April	16,942.24	310,942.98	71.13	363.51	1,975.00	3.50	11.21		250.00		330,559.57
May	183,633.66	355,291.07	176.47	467.64	1,248.00		3.61				540,820.45
June	413,514.77	330,434.75	100.71	754.26	1,597.00	5.12	65.33				746,471.94
July	506,449.64	317,457.40	443.86	891.42	3,543.00		43.60		250.00	20.00	829,098.92
August	556,175.74	415,182.59	260.41	1,007.45	2,049.00		1.35	7.35		20.00	974,703.89
September	96,399.14	399,786.76	187.27	5,172.13	3,611.00	1.87	15.51				505,173.68
October	28,394.67	395,601.10	139.51	2,433.51	3,439.00	3.75	7.79		250.00	6.17	430,275.50
November	151,836.53	401,554.71	126.18	2,157.15	3,915.00	12.40	106.53				559,708.50
December	388,299.69	406,592.14	52.73	1,776.01	6,321.00	5.01	22.93			17.51	803,087.02
Totals 1919	$3,398,105.15	$4,296,329.71	$ 1,787.92	$ 17,341.23	$ 28,321.00	$ 58.23	$ 363.70	$ 16.75	$ 1,000.00	$ 1,407.39	$7,744,731.08
Totals 1918	$3,399,131.40	$3,921,230.14	$ 1,236.27	$ 18.023.20	$ 18,545.50	$ 129.02	$ 442.01	$ 2.06	$ 1,000.00	$ 3,380.02	$7,363,119.62
Totals 1917	$3,564,786.22	$3,507,139.76	$ 1,047.18	$ 17.957.24	$ 59,117.50	$ 271.65	$ 746.44	$ 13.87	$ 1,000.00	$ 4,939.78	$7,157,019.64
Totals 1916	$3,425,868.96	$3,070,274.36	$ 976.99	$ 21,839.29	$ 41,084.00	$ 185.27	$ 576.90	$ 39.25	$ 1,000.00	$ 4,437.88	$6,566,282.90
Totals 1915	$3,358,960.34	$2,752,539.82	$ 1.462.12	$ 23.873.98	$ 37,119.50	$ 168.40	$ 639.60		$ 1,000.00	$ 4,968.32	$6,180,732.08
Tota's 1914	$3.371,227.26	$3.015,230.12	$ 1.658.68	$ 25.157.98	$ 38,452.50	$ 25.97	$ 231.77	$ 10.95	$ 1,000.00	$ 5,519.60	$6,458.514.83

NOTE:—The above earnings of $1,000.00 on contract were for water used by the International Harvester Company, pumped from the Fullerton Avenue conduit, The refunds, deducted from the gross collections as shown in Table No. 1, amounted to $37,956.64, distributed as follows: Assessed Rates, $30,857.78; Meter Rates. $6,695.30; Permits, $393.00; and Meter Mechanical, $10.56.

TABLE No. 3—COLLECTION DIVISION.

Comparative Statement of Collections, Increases or Decreases Thereof, Operation Expenses, and Proportion of Expenditures to Collections During 1914, 1915, 1916, 1917, 1918 and 1919.

Years	Gross Collections	Increase over previous year. (Decrease for 1914 and 1915)	Per Cent of Increase over previous year	Net Collections	Increase over previous year. (Decrease for 1914 and 1915)	Per Cent of Increase over previous year	Operation Expenses	Proportion of Expenditures to Gross Collections	Proportion of Expenditures to Net Collections
1919	$7,915,008.62	$417,561.39	5.5	$7,744,731.08	$381,611.46	5.3	$477,295.13	.0603	.0616
1918	7,497,447.23	158,469.57	2.2	7,363,119.62	206,099.98	2.8	397,157.12	.0529	.0539
1917	7,338,977.66	667,270.04	10.0	7,157,019.64	590,736.74	9.0	362,896.15	.0494	.0506
1916	6,671,707.62	352,128.04	5.5	6,566,282.90	385,550.82	6.2	353,528.62	.0529	.0538
1915	6,319,579.58	277,076.10	Decr.	6,180,732.08	277,782.75	Decr.	339,474.29	.0537	.0549
1914	6,596,655.68	84,201.33	Decr.	6,458,514.83	82,155.57	Decr.	320,773,43	.0486	.0496

NOTE:—The Operation Expenses include salaries, extra clerk hire, postage, stationery and all other expenses pertaining to the assessment and collection of water rates.

TABLE No. 4—COLLECTION DIVISION.

Debit Balances on April 30th and December 31st During the Years 1918 and 1919.

	1919		1918	
	April 30	Dec. 31	April 30	Dec. 31
Assessed Rates Accounts	$ 15,218.73	$1,348,500.42	$ 41,805.03	$1,448,157.54
Meter Rates Account	$702,589.65	688,988.63	551,858.93	625,611.78
Meter Mechanical Account	255.11	44.26	9.67	57.97
Suspense Account No. 1	1,190.44	360.69	566.77	988.28
Suspense Account No. 2	8,076.75	3,321.72	12,598.12	6,380.82
Totals	$727,330.68	$2,041,215.72	$606,838.52	$2,081,196.39

NOTE—The annual general assessment for frontage, fixtures and miscellaneous charges is levied on the first day of May for each ensuing year ending April 30th. The final collection period ends on the last day of February of each year. The debit balances, therefore, in Assessed Rates accounts are larger on December 31st than on April 30th.

TABLE No. 7—COLLECTION DIVISION—METER RATES SECTION

Analysis of General Ledger

	DEBIT					CREDIT					
Months	Balance January 1st 1919	Charges	Refunds	Discounts on Refunds	Totals	Collections	Discounts on Collections	Decreases	Transfers to Suspense No. 2	Balance December 31st, 1919	Totals
January	$ 625,611.78	$ 488,491.01	$ 156.64	$ 22.47	$1,114,281.90	$ 300,633.76	$ 96,523.74	$ 289.86	$ 33.14	$	$ 397,480.50
February		384,000.88	220.86	8.11	384,229.85	319,841.92	104,318.38	107.05	179.94		424,447.29
March		458,579.71	204.10	3.43	458,787.24	343,614.01	111,161.39	1,210.54	803.81		456,789.75
April		437,327.52	113.78	18.12	437,459.42	311,056.76	101,000.72	617.65	776.09		413,451.22
May		461,476.59	86.15	18.26	461,581.00	355,751.59	116,032.58	315.01	311.32		472,410.50
June		481,503.75	76.61	8.42	481,588.78	331,476.34	106,645.06	840.10	310.47		439,271.97
July		502,839.97	87.70	14.20	502,941.87	318,557.43	103,449.99	6,690.50	374.29		429,072.21
August		531,644.74	327.11	48.56	532,020.41	415,509.70	135,580.59	209.76			551,300.05
September		536,312.74	184.28	14.98	536,512.00	400,025.13	128,282.20	3,137.74	361.32		531,806.39
October		549,215.27	191.59	9.69	549,416.55	395,797.07	128,288.81	546.09	859.08		525,491.05
November		490,542.61	217.67	20.74	490,781.02	403,514.02	131,835.85	4,255.18	260.06		539,865.11
December		510,813.58	165.75	18.43	510,997.76	407,247.28	129,393.23	53,381.01	201.61	688,988.63	1,279,211.76
Totals 1919	$ 625,611.78	$5,832,748.37	$ 2,032.24	$ 205.41	$6,460,597.80	$4,303,025.01	$1,392,512.54	$ 71,600.49	$ 4,471.13	$688,988.63	$6,460,597.80
Totals 1918	$ 530,960.73	$5,338,728.52	$ 2,163.67	$ 423.00	$5,872,275.92	$3,926,067.57	$1,270,763.30	$ 45,176.50	$ 4,656.77	$625,611.78	$5,872,275.92
Totals 1917	$ 465,158.16	$4,748,980.15	$ 4,940.00	$ 330.29	$5,219,408.60	$3,512.364.30	$1,136,521.30	$ 35,768.43	$ 3,793.84	$530,960.73	$5,219,408.60
Totals 1916	$ 372,172.78	$4,211,796.70	$ 986.42	$ 175.64	$4,585,131.54	$3,081,158.08	$ 999,179.14	$ 36,407.81	$ 3,228.35	$465,158.16	$4,585,131.54
Totals 1915	$ 377,765.03	$3,694,922.69	$ 969.93	$ 71.62	$4,073,729.27	$2,761,367.60	$ 889,661.56	$ 38,135.71	$ 12,391.62	$372,172.78	$4,073,729.27
Totals 1914	$ 337,151.01	$3,682,138.43	$ 935.72	$ 53.15	$4,020,278.31	$3,020,437.88	$ 569,196.93	$ 51,523.94	$ 1,354.53	$377,765.03	$4,020,278.31

NOTE:—The December decreases of $53,381.01 include a total of $37,357.13 for free water service during 1919, under the Exemption Ordinance, Section 2755, Chicago Code of 1911.

TABLE No. 8—COLLECTION DIVISION—METER RATES SECTION

Distribution of Water Meters in Service December 31, 1919.

	In service Dec. 31, 1918	New installations and replacements for larger services during 1919	Meters removed on account of larger services installed during 1919	Other meters permanently removed during 1919	In service Dec. 31, 1919
Stores and flats	4,888	692	16	38	5,526
Business houses	1,790	3	2	5	1,786
Residence and apartment buildings	9,654	1,555	1	59	11,149
Factories	3,426	140	29	35	3,502
Railroads	830	10	2	6	832
Breweries	183	1	..	1	183
Liveries	631	1	..	..	632
Packing houses	182	11	2	11	180
Laundries	623	32	12	8	635
Hotels	386	7	1	3	389
Office buildings	421	4	..	..	425
Theatres	139	12	1	3	147
Charitable institutions	79	..	..	..	79
Miscellaneous	2,189	135	5	44	2,275
Totals	25,421	2,603	71	213	27,740

NOTE—The 2,275 Miscellaneous Meters comprise those controlling coal yards, garages, saloons, warehouses, amusement parks, etc. In addition to above there are 18 Hydraulic Elevator Dials.

The number of Assessed Rates Accounts on December 31, 1919, amounted to 281,501.

The above total of 27,740 includes 226 meters temporarily removed to the water meter shops for safekeeping on account of vacant premises.

TABLE No. 9—ASSESSMENTS DIVISION

Detailed Statement of Assessor's Increase and Decrease Checks During 1919

MONTHS	INCREASES			DECREASES		
	Back Tax	Current Tax	Totals	Back Tax	Current Tax	Totals
January	$ 21.38	$ 2,049.28	$ 2,070.66	$ 338.58	$ 20,792.20	$ 21,130.78
February	772.71	3,008.15	3,780.86	131.00	9,725.99	9,856.99
March	674.85	3,284.37	3,959.22	698.00	7,075.00	7,773.00
April	28.50	2,868.62	2,897.12	239.00	2,564.02	2,803.02
May	202.54	6,357.92	6,560.46	10,002.66	19,505.13	29,507.79
June	44.22	7,321.40	7,365.62	1,230.27	21,228.56	22,458.83
July	266.00	7,106.21	7,362.21	465.61	24,432.85	24,898.46
August	173.43	7,033.14	7,206.57	595.25	17,687.41	18,282.66
September	211.70	18,858.87	19,070.57	309.87	16,639.79	16,949.66
October	297.07	16,173.28	16,470.35	362.75	12,659.00	13,021.75
November	149.38	9,545.17	9,694.55	488.33	12,609.59	13,097.92
December	174.29	7,846.19	8,020.48	157.09	8,388.65	8,545.74
Assessed rates charitable				3,704.77	325,109.65	328,814.42
Assessed rates totals, 1919	$3,006.07	$ 91,452.60	$ 94,458.67	$18,723.18	$ 498,417.84	$ 517,141.02
Meter rates decreases						$ 34,243.36
Meter rates charitable dec						37,357.13
Meter mechanical decreases						2.69
Suspense account No. 1 dec						1,315.32
Suspense account No. 2 dec						7,184.98
Total decreases, 1919						$ 597,244.50
Total decreases, 1918						$ 614,329.30
Assessed Rates Totals 1918	$ 5,522.19	$ 84,369.33	$ 89,891.52	$39,025,42	$517,968.88	$ 556,994.30
Totals 1917	$ 6,194.32	$197,450.22	$203,644.54	$16,851.72	$464,975.75	$ 481,827.47
Totals 1916	$ 7,839.74	$288,306.86	$296,146.60	$14,335.16	$429,440.27	$ 443,775.43
Totals 1915	$ 4,149.91	$245,950.79	$250,100.70	$12,239.77	$393,295.16	$ 405,534.93
Totals 1914	$49,956.05	$284.527.01	$334,483.06	$57,962.93	$404,129.63	$ 462,092.56

NOTE—$366,171.55 was decreased during 1919 under the ordinance exempting Municipal, Charitable, Educational and Religious Institutions from the payment of water rates, and a decrease of $84,080.21 was made by reason of the transfer of assessed rates accounts to the meter rates ledgers, after meters were installed and controlled.

TABLE No. 10—ASSESSMENTS DIVISION

Detailed Statement of Free Water Service Accounts, Exempt from the Payment of Water Rates under Section 2755, Chicago Code of 1911

ASSESSED RATES

Municipal:			
Public Schools	$117,376.79		
Police Department	4,417.50		
Fire Department	3,753.34		
Public Baths	3,110.50		
Small Parks	8,155.00		
Hospitals	3,786.50		
Pumping Stations	30,811.50		
Various City Buildings	6,890.57		
Miscellaneous	2,825.75		
		$181,127.45	
Religious, Educational and Charitable:			
Churches and Parsonages	$ 46,828.49		
Parochial, Private Schools and Colleges	38,323.42		
Hospitals	16,048.50		
Homes	13,095.81		
Miscellaneous	6,928.50		
		$121,224.72	
State and County:			
Hospitals	$ 4,624.00		
Parks	17,536.00		
University Schools	2,248.00		
State Armories, Illinois National Guard	1,694.75		
Miscellaneous	359.50		
		$ 26,462.25	
Total Assessed Rates			$328,814.42

METER RATES

Municipal:			
Public Schools	$ 616.31		
Small Parks	210.65		
Miscellaneous	137.53		
		$ 964.49	
Religious, Educational and Charitable:			
Churches and Parsonages	$ 1,266.40		
Parochial, Private Schools and Colleges	3,988.46		
Hospitals	6,156.63		
Homes	4,614.12		
Miscellaneous	4,371.14		
		$ 20,396.75	
State and County:			
Hospitals	$ 15,458.34		
State Armories, Illinois National Guard	537.55		
		$ 15,995.89	
Total Meter Rates			$ 37,357.13
Total Free Service, 1919			$366,171.55
Total Free Service, 1918			349,880.38
Total Free Service, 1917			339,120.85
Total Free Service, 1916			328,918.34
Total Free Service, 1915			315,337.89
Total Free Service, 1914			300,518.99

TABLE No. 11

ASSESSMENTS DIVISION—PERMIT SECTION

Permits issued during 1919

	¾ inch	1 inch	1¼ inch	2 inch	Miscl. sizes	Totals
Permits issued for ¾ to 2-inch pipes	1,588	15	70	111	....	1,784
Permits issued under Council Orders	3	....	1	3	....	7
Special Permits issued for Connections and Repairs	....	....	....	....	222	222
Permits issued for Street Improvements (Special Assessment)	3,121	....	....	....	....	3,121
Permits issued for Street Improvements (Private Contract)	1,261	....	....	....	....	1,261
Totals 1919	5,973	15	71	114	222	6,395
Totals 1918	3,881	15	40	87	295	4,318

Permits Issued for Larger Pipes	3-inch	4-inch	6-inch	8-inch	10-inch	12-inch	16-inch	Totals
Scattering	48	62	48	24	1	....	....	183
On Council Orders	....	1	....	....	....	....	....	1
Totals 1919	48	63	48	24	1	....	....	184
Totals 1918	27	47	60	19	....	9	1	163

Service pipes installed prior to January 1, 1919	502,669
Service pipes installed during the year 1919	6,579
Total Service pipes installed to December 31, 1919	509,248
Total Collections for Permits issued during 1919	$28,714.00
Total Collections for Permits issued during 1918	18,793.00
Increase Collections for Permits issued during 1919	$ 9,921.00

TABLE No. 12—ASSESSMENT DIVISION

Buildings Examined

Years	1 Story	2 Story	3 Story	4 Story	5 Story or over	Special Examinations	New Buildings	Exams. for Vacancies	Pipe Petitions	Barns	Hose	Totals
1919..................	30,067	56,698	22,425	5,197	883	23,132	8,479	37,188	958	30,426	3,194	218,647
1918..................	26,138	56,142	25,274	6,370	1,075	28,629	8,545	48,366	513	3,932	31,175	236,115
1917..................	28,500	52,267	17,231	3,952	975	19,335	19,631	46,963	857	29,104	4,708	223,523

TABLE No. 13—COLLECTION DIVISION

Shut-Off Visits

Years	Services Shut off for Non-payment	Meters Shut off for Non-payment	Service Pipes Cut	Assessed Rates			Meter Rates	Total Visits
				Shut off by Request of Owner or Agent	Turn-ons	Notices of Delinquency Served	Notices of Delinquency Served	
1919..................	1,262	318	4	5,569	827	30,235	4,865	41,496
1918..................	1,485	353	2	8,888	818	28,742	5,089	43,537
1917..................	1,671	353	6	8,593	777	29,219	3,909	43,498

TABLE No. 14—INCOME ACCOUNT

Revenue

From Assessed Rates:			
General Assessment, May 1, 1919	$4,780,327.50		
Increase to Back Tax	3,006.07		
Increase to Current Tax	91,452.60	$4,874,786.17	
Less—			
Discount allowed for prompt payment	$1,047,720.06		
Erroneous assessments refunded	10,731.10		
Decreases on account of Municipal, Charitable, Educational and Religious Institutions, in accordance with Section 2755, Chicago Code of 1911	328,814.42		
Decreases on Council Orders and on account of revised assessments by reason of annual and special examination reports, fixture removals, buildings torn down, draw-backs on previous payments on account of vacancy, changes from frontage to meter rates, etc	188,326.60		
Decreases on Suspense Account No. 1	1,315.32	$1,576,907.50	
Net Revenue from Assessed Rates			$3,297,878.67
From Meter Rates:			
Meter rates charges, as per rate takers' daily reports, and increases from Assessor's checks		$5,832,748.37	
Less—			
Discount allowed for prompt payment	$1,392,307.13		
Erroneous charges refunded	4,663.06		
Decreases on account of Municipal, Charitable, Educational and Religious Institutions, in accordance with Section 2755, Chicago Code of 1911	37,357.13		
Decreases on account of Council Orders, and on account of estimated bills on claims supported by affidavits, etc	34,243.36		
Decreases on Suspense Account No. 2	7,184.98	$1,475,755.66	
Net Revenue from Meter Rates			$4,356,992.71
From Meter Mechanical:			
Charges for labor and material in repairing meters		$ 1,795.35	
Less—			
Decrease on account of erroneous charge		2.69	
Net Revenue from Meter Mechanical			$ 1,792.66
From Assessments Division:			
Sprinkling wagons, cement walks and miscellaneous charges	$ 18,748.62		
Tap permits issued	28,714.00	$ 47,462.62	
Less—			
Refunds of unused permits		393.00	
Net Revenue from Assessments Division			$ 47,069.62
From Miscellaneous Revenue Account			16.75
From Contract			1,000.00
Total Net Revenue			$7,704,750.41

Expenses

Salaries, Wages and Team Hire:			
Superintendent's Office, Salaries	$ 8,640.00		
Collection Division, General, Salaries	28,907.19		
Assessed Rates Section, Salaries	58,609.18		
Meter Rates Section, Salaries	84,019.21		
Shut-off Section, Salaries	25,250.42		
Assessments Division, General, Salaries'	130.599.87		
Permit and Map Section, Salaries	16.869.99		
Auditing Division, Salaries	20,530.60		
Overtme for Emergency Work, Salaries	6,778.82		
Extra Clerk Hire	7.257.19		
Shut-Off Team Hire	11,311.75		
Meter Rates Team Hire	41,759.00		
Total Salaries, Wages and Team Hire		$ 440,533.22	
Miscellaneous:			
Personal Services	$ 1,182.03		
Material and Supplies	592.30		
Furniture, Fittings, Fixtures and Library	921.57		
Printing, Stationery and Office Supplies	32,957.03		
Passenger Transportation	1,097.33		
Impersonal Services	11.65		
Total Miscellaneous Expenses		$ 36,761.91	
Total Expenses			$ 477,295.13
Net Income of the Bureau of Water			$7,227,455.28

TABLE No. 15

Balance Sheet as of December 31, 1919

Debit

Debit Balances January 1, 1919	$2,081,245.73		
Less: Sixth Ward Credit Balance	49.34		
Net Debit Balances, January 1, 1919		$2,081,196.39	
Expenses during 1919:			
Salaries, Wages and Team Hire (Table 14)	$ 440,533.22		
Miscellaneous Expenses (Table 14)	36,761.91		
Total Expenses		477,295.13	
Net Income 1919 (Table 14)		7,227,455.28	
			$9,785,946.80

Credit

Credit Balance against City Comptroller, December 31, 1919, as follows:			
Net Collections by the Cashier, Bureau of Water	$7,742,306.94		
Amounts collected on warrants for collection:			
For water used in constructing cement walks	1,407.39		
For earnings on contract	1,000.00		
For sale of old material	16.75		
Total Net Collections		$7,744,731.08	
Debit Balances, December 31, 1919, as follows:			
Assessed Rates	$1,348,827.20		
Meter Rates	688,988.63		
Meter Mechanical	44.26		
Suspense Account No. 1	360.69		
Suspense Account No. 2	3,321.72		
Total Debit Balances		$2,041,542.50	
Less: Third Ward Credit Balance	$ 51.71		
Sixth Ward Credit Balance	275.07		
Total Credit Balances		326.78	
Net Debit Balances, December 31,1919			$2,041,215.72
			$9,785,946.80

BUREAU OF RIVERS AND HARBORS

HON. CHAS. R. FRANCIS,
Commissioner of Public Works.

Dear Sir:

I submit herewith the Annual Report of the Bureau of Rivers and Harbors for the year 1919, showing permits issued, fees collected and work performed in the development of the Harbor of the City of Chicago.

Commerce in the Chicago River shows a gain of 266 vessels and 437,036 tons, while the Calumet River shows a loss of 345 vessels and 1,765,190 tons, which brings a total loss to the City of Chicago of 79 vessels of 1,328,154 reg. tons, as compared to the year 1918. This decrease may be attributed to the prolonged strike of the steel workers in the Calumet region.

The permit fees for 1919 in amount of $4,934.63, exceed the amount of fees collected in 1918 and marks a general tendency on the part of dock owners towards improving their docking facilities.

The function of bridge operation has been carried on in an efficient manner. A rigid campaign for cleanliness was put into effect with the result that the sidewalks and roadways now have a presentable appearance, and bridge houses and storerooms have been divested of all scrap materials, including old and broken machinery which has accumulated. This bureau operated 45 bridges during the year, each 24 hours daily. In addition the ferry at 100th Street and the Calumet River was operated 8 hours daily. During 1919 there were employed 252 bridgetenders and with the completion of the Franklin-Orleans and Michigan Avenue Bridges 15 additional bridgetenders will be needed, making a total of 267 for 1920.

In conjunction with the above I wish to call your attention to the unnecessary expense imposed upon the City of Chicago owing to the inadequate amount of bond required of bridgetenders. Their present bond is $1,500, as established by an amendment to Section 1099 of the Chicago Code of 1911. Said bond safeguards the city in the event of any damage caused a steamer by neglect or accident on the part of the bridgetender or by failure of the bridge machinery to function properly. In cases where the damage done exceeds $1,500 it is necessary for the City Council to obtain the balance of money. In order to obviate this necessity it would be equitable to have the bridgetenders' bond raised to $5,000.

A highly significant event in 1919 was the passage of an Act to amend an act entitled "An Act Creating a Rivers and Lakes Commission for the State of Illinois, and Defining the Duties and Powers Thereof," approved June 10, 1911; in force July 1, 1911, as subsequently amended, by amending Sections 18, 23, 24, 26 and 29 thereof, and by adding a new section to be known as Section 30. This act went into effect in July and under it the State of Illinois, through the Division of Waterways, Department of Public Works and Buildings, exercises dual powers with the City of Chicago in the supervision of Harbor developments and improvements. Much inconvenience is caused to contractors and others contemplating new work for the reason that it is now necessary to obtain state permission in addition to city permit for all work throughout the Harbor Area. It would seem as though a city of the proportions of the City of Chicago has the necessary talent and initiative to guard and promote its own harbor facilities, and I therefore look forward to the time when Chicago shall be granted the responsibility of "Home Rule" whence harbor matters shall receive the high consideration they merit.

The year 1919 will stand as a monument by virtue of the passage of the "Lake Front Ordinance," under which the lake front between 12th Street and 53rd Street is to be restored to the people of the City of Chicago both for recreation and commercial purposes. The project is too gigantic to admit of elaborate description here. Let it be sufficient to say that Chicago as a port is on the threshold of a new era. Just what part the Bureau of Rivers and Harbors shall play in this new development remains to be seen. I am hopeful, however, that this bureau be given increased responsibilities so that it may enlarge and expand even to the extent of shouldering the entire supervision of the project.

An Ordinance for a Harbor Improvement second in importance only to the Lake Front project was passed by the City Council on December 15, 1919, page 1576 c. p. Said ordinance provides for the widening of South Water Street between Lake Street and Wabash Avenue, and River Street between Wabash Avenue and North Michigan Avenue (as widened). A two-level street is proposed of width extending from the present south line of South Water and River Streets up to the south line of the Main Branch of the Chicago River, resulting in the relief of present congestion in addition to improved docking facilities.

During the fall of 1919 this bureau acted as host to various Harbor Commissions and Engineers from Foreign Countries as well as from other principal cities in the United States. The principal ones were the Canadian Harbor Commission, Harbor representative from the Dutch East Indies and the Consulting Engineer from the N. Y. and N. J. Port and Development Commission. Needless to say these men were given unusual privileges and opportunities to study the port of Chicago, and I feel certain they carried away larger ideas of Chicago than they anticipated.

I beg to call your attention to the following summaries of dredging, docking and other work performed in the interest of the harbor. The City of Chicago expresses its grateful appreciation to Col. W. V. Judson, Corps of Engineers U. S. Army, and his assistants for their co-operation; to the officers of the Sanitary District of Chicago, and to the South Park and Lincoln Park Commissioners, for information and data furnished from time to time.

PERMITS ISSUED

FOR THE CONSTRUCTION OF NEW DOCKS

Year 1919

Location of work	Number of Permits	Lineal feet Constructed	Fees Collected
Main Chicago River	....	....	....
North Branch Chicago River	....	....	....
South Branch Chicago River	1	940	$235.00
Calumet River	3	1053	263.25
Lake Michigan	....	....	......
Total	4	1993	$498.25

FOR THE REBUILDING OF OLD DOCKS

Location of Work	Number of Permits	Lineal feet Constructed	Fees Collected
Main Chicago River	2	290	$ 72.50
North Branch Chicago River	11	1422	255.50
South Branch Chicago River	12	2561	640.25
Calumet River	4	1554	388.50
Lake Michigan	1	180	45.00
Total	30	6007	$1501.75

FOR THE REPAIRING OF OLD DOCKS

Location of Work	Number of Permits	Lineal feet Constructed	Fees Collected
Main Chicago River	12	423	$ 42.88
North Branch Chicago River	8	1158	144.75
South Branch Chicago River	16	2132	255.25
Calumet River	3	876	109.50
Lake Michigan	1	180	22.50
Total	40	4769	$574.88

FOR DRIVING PILES

Including piles separately driven under other docking permits, but not included under the three other classifications.

Location of Work	Number of Permits	Piles Driven	Fees Collected
Main Chicago River	5	21	$ 5.25
North Branch Chicago River	6	114	28.50
South Branch Chicago River	9	108	21.50
Calumet River	3	78	19.50
Lake Michigan	....	....	......
Total	23	321	$ 74.75

	Building Work	Bridge Work	Water Pipe Work	Sewer Work	Electrical Work	Dumping and Filling	Snow Dumping	Dock Work (Shore Protection)	Ice House Work	Miscellaneous Work	Totals	FEES
Main Chicago River	4	....	....	....	....	....	....	....	....	....	4	$ 40.00
N. Branch Chicago River	4	2	2	8	2	1	....	....	....	10	29	255.00
S. Branch Chicago River	1	5	2	3	4	1	1	....	....	4	21	190.00
Calumet River	3	....	....	2	....	2	....	....	....	1	8	80.00
Lake Michigan	2	....	....	....	....	2	....	9	....	2	15	100.00
Lake Calumet	....	....	....	....	....	1	....	....	2	....	3	30.00
Sanitary Canal	....	....	....	1	....	1	....	....	....	1	3	30.00
Totals	14	7	4	14	6	8	1	9	2	18	83	$725.00

FOR DREDGING—During Year 1919

Location of Work	Number of Permits	Number of 8-hour Days	Fees Collected
Main Chicago River	11	20	$ 80.00
North Branch Chicago River	8	14	56.00
South Branch Chicago River	7	17	56.00
Calumet River	9	47	188.00
Lake Michigan	19	115	460.00
Lake Calumet	2	7	28.00
Total	56	220	$868.00

FOR TOWING SCOWS

Loaded with Other Than Dredging Material—During Year 1919

Location of Work	Number of Permits	Number of 8-hour Days	Fees Collected
Main Chicago River	19	395	$ 60.00
North Branch Chicago River	3	3	12.00
South Branch Chicago River	32	138	552.00
Calumet River	4	17	68.00
Totals	58	553	$692.00

SUMMARY OF FEES COLLECTED DURING THE YEAR 1919

For Dock Permits	$2,649.63
For Dredging Permits	868.00
For Towing Permits	682.00
For Special Permits	725.00
Total	$4,934.63

SOURCES OF MATERIAL DUMPED IN LAKE MICHIGAN

Months	From Disposal Stations		From Dredging	
	Scows	Cubic Yards	Scows	Cubic Yards
January	21	11,558	31	14,569
February	16	9,098	8	4,283
March	24	14,790	22	12,655
April	47	26,557	108	59,575
May	51	33,248	77	42,087
June	33	18,633	38	20,528
July	10	4,507	63	33,420
August	10	4,581	103	57,838
September	6	1,819	52	28,129
October	28	14,589	81	43,838
November	8	4,020	72	35,869
December	2	985	9	5,059
Totals	256	144.385	664	357,850

WHERE DEPOSITED IN LAKE MICHIGAN

	13-mile Dumping Area Chicago		Indiana Harbor		Lincoln Park		South Chicago 8 miles in Indiana Waters	
	Scows	Cubic Yds.	Scow	Cubic Yds.	Scows	Cubic Yds.	Scows	Cubic Yds.
January	48	23,616	..	......	..	......	4	2,511
February	24	13,381	..	......	..	......	..	......
March	29	16,900	..	......	..	......	17	10,545
April	43	23,708	..	......	4	2,849	108	59,575
May	..	......	..	......	52	33,608	76	41,727
June	6	3,044	2	1,184	31	18,141	32	16,792
July	8	3,305	12	5,961	30	16,832	23	11,829
August	31	15,632	..	......	14	8,027	68	38,760
September	6	1,819	..	......	2	795	50	27,334
October	3	1,537	..	......	27	13,602	79	43,288
November	9	4,087	..	......	8	2,635	63	33,167
December	11	6,044	..	......	..	......	..	......
Totals	218	113,073	14	7,145	168	96,489	520	285,528

TABLE SHOWING ELEVATION OF SURFACE OF LAKE MICHIGAN

In Feet, Referred to City Datum by Month of Year 1919, From Observations taken at Two-Mile Crib

Months	Max.	Min.	Mean	Range	Remarks	
					Maximum	Minimum
January	+1.2	-2.0	+0.352	3.2	Jan. 9th	Jan. 8th
February	+1.2	-0.6	+0.496	1.8	Feb. 15th	Feb. 28th
March	+1.2	-0.2	+0.590	1.4	March 21	March 12
April	+1.5	-0.3	+0.882	1.2	April 15th	April 6th
May	+1.7	+0.7	+1.277	1.0	May 20th	May 2nd
June	+1.6	+1.0	+1.337	0.6	June 27th	June 14th
July	+1.6	+0.4	+1.052	1.2	July 7th	July 27th
August	+1.4	+0.4	+0.835	1.0	Aug. 1st	Aug. 29th
September	+1.0	+0.0	+0.483	1.0	Sept. 11th	Sept. 27th
October	+1.1	+0.0	+0.445	1.1	Oct. 4th	Oct. 18th
November	+1.2	-0.6	+0.119	1.8	Nov. 25th	Nov. 30th
December	+1.0	-1.1	-0.127	2.1	Dec. 25th	Dec. 16th
Year 1919	+1.7	-2.0	+0.645	3.7	May 20th	Jan. 8th

A comparison of water levels for the years 1918 and 1919 shows that the mean level for the year 1919 is 0.435′ lower than that for the year 1918.

WATER TEMPERATURE, CHICAGO, 1919

Monthly and Annual Means, Maximum in Degrees Fahrenheit from Observations taken at Two-Mile Crib

Month	Maximum	Minimum	Monthly Mean	Range	Remarks Maximum	Remarks Minimum
January........	34	32	32	2	January 31st	January 2nd
February.......	32	32	32	..	February 1st	February 28th
March..........	39	32	35	7	March 29th	March 14th
April..........	46	37	43	9	April 30th	April 2nd
May...........	56	46	49	10	May 31st	May 1st
June...........	72	48	58	24	June 21st	June 14th
July...........	74	62	69	12	July 21st	July 1st
August.........	72	68	71	4	August 12th	August 24th
September......	70	64	68	6	September 8th	September 26th
October........	64	53	58	11	October 2nd	October 29th
November......	54	39	45	15	November 1st	November 30th
December......	36	32	32	4	December 1st	December 3rd
Year 1919......	74	32	53	42	July 21st	January 2nd

TABLE SHOWING SURFACE VELOCITY OF SOUTH BRANCH CHICAGO RIVER

At Harrison Street, as reported by Harbor Police

Month	Date	Maximum Velocity	Date	Minimum Velocity	Mean for Month Velocity
January.........	31	2.40 feet second	2,16,17,18,21	1.95 feet second	2.13 feet second
February........	6	2.51 feet second	21,25	1.85 feet second	2.07 feet second
March..........	10	2.24 feet second	19	1.82 feet second	2.02 feet second
April...........	28,30	2.16 feet second	25	1.89 feet second	1.98 feet second
May............	17,20	2.15 feet second	9,12,15,16	1.95 feet second	2.05 feet second
June............	5	2.15 feet second	7	1.76 feet second	1.95 feet second
July............	16	2.11 feet second	5	1.85 feet second	1.90 feet second
August..........	18	2.03 feet second	1	1.85 feet second	1.92 feet second
September......	13	1.99 feet second	4	1.85 feet second	1.88 feet second
October.........	28	2.64 feet second	3	1.85 feet second	2.10 feet second
November......	13	2.66 feet second	5	2.40 feet second	2.58 feet second
December.......	27	2.66 feet second	9	2.03 feet second	2.32 feet second
Year 1919.......	Nov. 13 Dec. 27	2.66 feet second	June 7	1.76 feet second	2.075 ft. second

The resultant velocity at the surface being 2.075 feet per second, yields when reduced, a mean velocity for the whole cross-section of the South Branch of 1.66 feet per second .

This means velocity for a cross section of 200′ x 21′ (taken as a standard when the widening of the river is completed) gives 6,972 foot seconds for its average discharge during the year 1919.

VESSELS BUILT AT CHICAGO DURING THE YEAR 1919

Together With Their Gross and Net Tonnage

Rig	Name of Vessel	Gross Tonnage	Net Tonnage
St. s.	Lake Grainger....................................	2,615	1,602
St. s.	Lake Grampian..................................	2,615	1,602
St. s.	Lake Grama..	2,615	1,602
St. s.	Lake Grampus.....................................	2,615	1,602
St. s.	Lake Granby.......................................	2,615	1,605
St. s.	Lake Gasette......................................	2,664	1,630
St. s.	Lake Gebhart......................................	2,810	1,704
St. s.	Lake Gera..	2,637	1,619
Ga. s.	E. S. Conway.......................................	27	12
Ga. s.	Agnes..	19	17
Ga. y.	Lobo..	28	15
Ga. y.	Marguerite III.....................................	46	24
Ga. y.	Roy L. II..	29	15
Ga. y.	Berestha...	22	12

LAKE COMMERCE OF CHICAGO—1919

Receipts

Commodity	Chicago River	Calumet River	Total
Coal, hard, tons	474,854	209,436	684,290
Coal, soft, tons	40	635,670	635,710
Iron ore, tons	....	5,048.780	5,048.780

This is exclusive of 2,475,526 tons received at Gary, and 911,306 tons received at Indiana Harbor.

Commodity	Chicago River	Calumet River	Total
Salt, tons	97,160	....	97,160
Iron, manufactured, tons	150	....	150
Lumber, M. feet	41,265	....	41,265
Railroad ties, pieces	103,156	....	103,156
Sugar, tons	11,152	....	11,152
Limestone, tons	....	981,173	981,173
Flaxseed, bushels	110.000	....	110.000
Unclassified, tons	348.818	2,976	351,794

Shipments

Commodity	Chicago River	Calumet River	Total
Flour, tons	23,542	4,902	28,454
Wheat, bushels	8,412,979	27,452,294	35,865,273
Corn, bushels	250,700	753,467	1,004,167
Oats, bushels	1,925,654	4,868,600	6,794,254
Rye, bushels	35,000	999,682	1,034,682
Barley, bushels	472,000	632,600	1,104,600
Mill stuffs, tons	21,769	1,703	23,472
Wool sacks	73	....	73
Unclassified, tons	260,824	573	261,397

2,596,000 barrels of gasoline and 922,000 barrels of oil were shipped from Indiana Harbor, Indiana.

THE NUMBER OF VESSELS WHICH ENTERED AND CLEARED AT THE PORT OF CHICAGO

During the Year 1919, and Their Registered Net Tonnage

Entrances

Chicago River	2,340	vessels, registered net tonnage	2,478,707
Calumet River	937	vessels, registered net tonnage	3,696,448
Total	3,277		6,175,155

Clearances

Chicago River	2,327	vessels, registered net tonnage	2,425,052
Calumet River	965	vessels, registered net tonnage	3,698,610
Total	3,292		6,123,662

Summary Total Lake Trade of the City of Chicago

Chicago River	No. of Vessels	Reg.Tonnage
Entered, 2,340 vessels, 2,478,707 reg. tons Cleared, 2,327 vessels, 3,628,937 reg. tons	4,667	4,903,759
Calumet River		
Entered, 937 vessels, 3,696,448 reg. tons Cleared, 965 vessels, 3,698,610 reg. tons	1,902	7,395,058
Totals for the City of Chicago	6,569	12,298,817

which for the year 1919 give the following values of the average cargo per vessel:

Chicago River	1,050 tons
Calumet River	3,888 tons
City of Chicago	1,872 tons for the whole City Trade.

COMPARISON OF COMMERCE OF 1919 WITH 1918

Chicago River entrances, gain of	146 vessels of	368,732 reg. tons gain
Chicago River clearances, gain of	120 vessels of	68,304 reg. tons gain
Gain	266 vessels of	437,036 reg. tons gain
Calumet River entrances, loss of	171 vessels of	831,072 reg. tons loss
Calumet River clearances, loss of	174 vessels of	934,118 reg. tons loss
Total loss of	345 vessels of	1,765,190 reg. tons loss
Total loss for City of Chicago	79 vessels of	1,328,154 reg. tons loss

BRIDGE OPERATION DIVISION

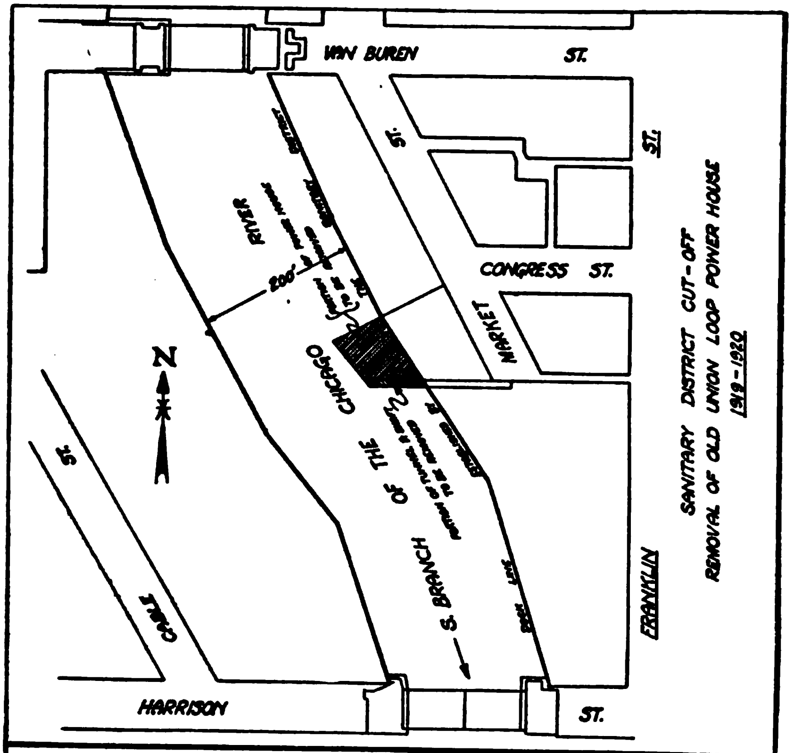
The following table gives a detailed account of bridges operated by the City.

BRIDGE	POWER	Average time of each opening in minutes	Total number of openings annually
Adams St	Electricity	3.12	1,019
Archer Ave	Electricity	3.69	853
Ashland Ave. (West Fork)	Electricity	4.99	1,598
Belmont Ave	Electricity	3.62	479
Canal St	Electricity	3.75	1,312
Chicago Ave	Electricity	3.54	1,020
Clark St	Electricity	3.61	2,087
Cortland St	Electricity	3.00	1,108
Dearborn St	Electricity	3.54	2,239
Diversey Blvd	Electricity	3.08	684
E. Division St	Electricity	3.91	513
W. Division St	Electricity	3.26	890
18th St	Electricity	3.57	805
Erie St	Electricity	4.80	1,160
Fullerton Ave	Electricity	3.83	505
Grand Ave	Electricity	3.67	1,053
N. Halsted Canal	Electricity	3.58	1,563
N. Halsted River	Electricity	4.22	964
S. Halsted St. Lift	Electricity	4.34	1,223
Harrison St	Electricity	3.06	2,194
Jackson Blvd	Electricity	3.63	990
Kinzie St	Electricity	3.22	7,159
Lake St	Electricity	3.78	1,172
Loomis St	Electricity	3.81	1,567
Madison St	Electricity	4.19	1,065
Monroe St	Electricity	3.66	974
92nd St	Electricity	3.30	3,682
95th St	Electricity	4.01	2,085
North Ave	Electricity	3.85	783
106th St	Hand	6.45	4,076
Polk St	Electricity	3.08	1,084
Randolph St	Electricity	3.20	1,465
Roosevelt Road (12th St.)	Electricity	4.24	1,222
Rush St	Electricity	3.67	1,309
State St	Electricity	3.21	3,919
Taylor St	Electricity	3.78	543
Throop St	Electricity	3.25	1,801
Torrence Ave	Gasoline	10.05	1,264
22nd St	Electricity	3.71	1,168
35th St	Electricity	3.11	1,088
Van Buren St	Electricity	3.45	1,286
Washington St	Electricity	3.06	1,018
Webster Ave	Electricity	3.06	1,058
Wells St	Electricity	3.91	1,976
N. Western Ave	Electricity	2.97	973

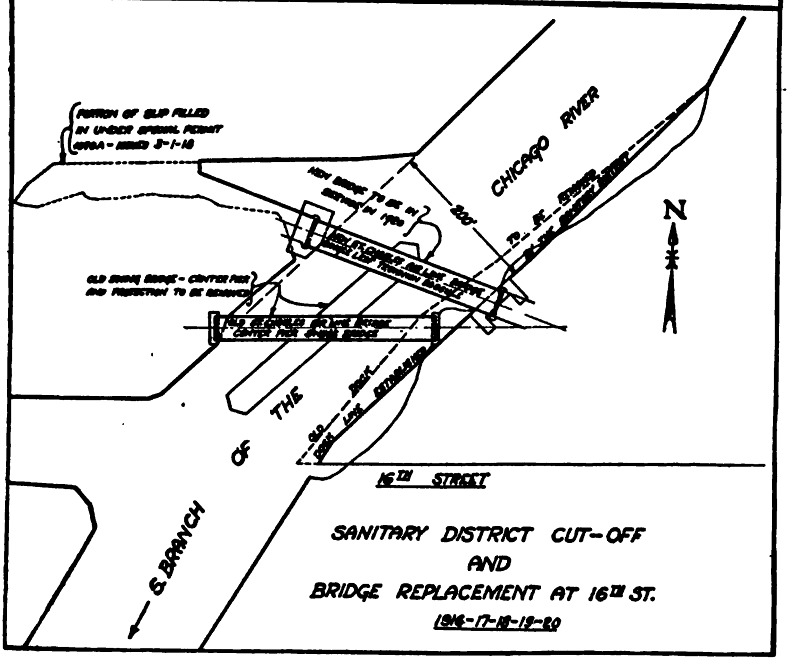
STATEMENT OF EXPENDITURES FOR BRIDGE OPERATION

for Year ending December 31, 1919

BRIDGE	Bridge-tenders' Salaries	Supplies	Fuel	Telephone etc.	Totals
Adams St.	$ 4,289.83	$ 107.05	$ 136.06	$.........	$ 4,532.94
Archer Ave.	8,980.55	70.55	73.30	36.51	9,160.91
Ashland Ave (West Fork)	8,789.81	191.67	261.25	37.30	9,280.03
Belmont Ave.	9,206.47	38.62	222.56	36.81	9,504.46
Canal St.	9,229.88	165.34	248.06	37.18	9,680.46
Chicago Ave.	8,892.30	131.97	271.36	43.81	9,339.44
Clark St.	4,384.49	99.09	149.16	....	4,632.74
Cortland St.	9,125.06	59.55	160.25	35.58	9,380.44
Dearborn St.	8,777.59	133.05	246.86	43.57	9,201.07
Diversey Blvd.	4,521.61	68.57	124.66	52.71	4,767.55
East Division St.	9,097.14	62.52	163.76	36.56	9,359.98
West Division St.	8,563.47	76.81	148.23	37.11	8,825.62
18th St.	9,163.97	60.19	221.11	38.42	9,483.69
Erie St.	9,150.39	72 33	220.50	51.18	9,494.40
Fullerton Ave.	4,516.16	35.38	69.51	32.41	4,653.46
Grand Ave.	8,595.95	174.41	262.48	37.99	9,070.83
N. Halsted St. (Canal)	8,968.77	128.30	222.20	39.22	9,358.49
N. Halsted St. (River)	9,177.51	141.04	220.27	42.69	9,581.51
S. Halsted St. (Lift)	4,873.11	137.40	193.66	51.16	5,255.33
Harrison St.	8,677.86	160.69	132.99	60.33	9,031.87
Jackson Blvd.	9,497.91	78.69	296.50	42.11	9,915.21
Kinzie St.	8,747.78	155.59	208.98	50.33	9,162.68
Lake St.	9,196.92	185.48	481.66	45.36	9,909.42
Loomis St.	9,283.67	69.16	115.36	38.35	9,506.54
Madison St.	4,392.94	158.71	48.60	2.45	4,602.70
Monroe St.	8,292.06	165.33	219.90	40.47	8,717.76
92nd St.	8,994.50	79.50	201.30	55.14	9,330.44
95th St.	8,745.17	119.44	214.32	37.35	9,116.28
North Ave.	8,909.87	62.87	85.95	37.02	9,095.71
100th St. Ferry	1,441.75	10.18	49.05	....	1,500.98
106th St.	11,377.03	90.92	107.00	57.92	11,632.87
Polk St.	8,620.88	121.03	173.17	36.46	8,951.54
Randolph St.	8,602.19	90.52	213.32	43.25	8,949.28
Roosevelt Road (12th St.)	4,494.66	110.04	89.25	41.85	4,735.80
Rush St.	4,384.02	114.24	170.60	91.04	4,759.90
State St.	9,313.66	103.41	192.80	37.27	9,647.14
Taylor St.	3,840.80	94.88	60.05	38.32	4,034.05
Throop St.	8,891.91	68.98	179.83	36.57	9,177.29
Torrence Ave.	9,175.56	162.22	543.18	52.01	9,932.97
22nd St.	9,014.41	154.17	194.42	47.97	9,410.97
35th St.	8,936.07	98.96	64.61	47.03	9,146.67
Van Buren St.	9,064.61	161.78	258.99	53.29	9,538.67
Washington St.	8,953.32	107.31	284.97	39.80	9,385.40
Webster Ave.	8,679.04	74.62	172.40	45.63	8,971.69
Wells St.	4,470.00	189.62	....	....	4,659.62
N. Western Ave.	9,300.54	53.60	195.60	36.00	9,585.74
Superintendence	1,200.00	981.09	....	107.21	2,288.30
Grand Totals	$ 362,803.19	$ 5,976.87	$ 8,570.04	$ 1,910.74	$ 379,260.84



SANITARY DISTRICT CUT-OFF
REMOVAL OF OLD UNION LOOP POWER HOUSE
1919-1920



SANITARY DISTRICT CUT-OFF
AND
BRIDGE REPLACEMENT AT 16TH ST.
1916-17-18-19-20

WORK DONE BY THE SANITARY DISTRICT OF CHICAGO, 1919.

Work on the removal of that portion of the old Union Loop Power House extending riverward of the east dock of the South Branch of the Chicago River at Congress Street, was begun in the fall of the year, as was also the construction of about nine hundred lineal feet of dock on the southeasterly side of the South Branch of the Chicago River extending northeasterly from 16th Street. These two projects constitute the last cutoffs to be made by the Sanitary District in widening the South Branch to 200 feet. With the completion of the new St. Charles Air-Line Bridge during 1920 and the removal of the old center-pier draw bridge at that location, much will have been accomplished in the interest of navigation.

It was thought appropriate to include plats showing the location and character of above work. They will be found elsewhere in this report.

There has been considerable discussion regarding the filling of "Bubbly Creek." It has been proposed to construct an 18-foot sewer in the east arm of the south fork, after which the open channel is to be filled. Also, public hearings have been held regarding the construction of a Sludge Plant in the west arm of the south fork, the object being to fill up said waters and purify the factory waste. Undoubtedly much could be gained from the standpoint of health and it is not impossible that the year 1920 will mark the beginning, if not the completion of the proposed work.

WORK DONE BY THE UNITED STATES GOVERNMENT IN IMPROVEMENT OF THE HARBOR DURING 1919.

Chicago Harbor.

Owing to the exhaustion of all available "D" stone, work was in progress only about two months on the construction of the south arm of the southerly extension of the exterior breakwater, and 9,407.6 tons of stone were placed at an expense of about $15,000. Although stone has been deposited for a length of 1,550 feet, only 310 feet have been completed in section.

Work authorized for the season of 1920 will consist in completing the construction of 1,240 lineal feet of said breakwater to full section, leaving 1,180 lineal feet of the total proposed 5,000 lineal feet for future construction.

Chicago River

No dredging or other contract work was done. Work under permits for bridges, dredging, dumping, etc., inspected and property and plant repaired and cared for.

No dredging work is proposed for the season of 1920, as anticipated shoaling has not occurred to any great extent in the portion of the river under U. S. maintenance, based on examination soundings taken in November, 1919.

The wreck of the Steamer C. W. Moore, which sank in the west side of the North Branch Canal next south of Division Street was removed under government contract by the FitzSimons and Connell Dredge and Dock Co. on August 19th. Said steamer was taken 13 miles into the lake and caused to sink in 68 feet of water.

Calumet Harbor.

Damages to breakwater (caused by storms) were repaired with the government plant and hired labor, and a contract was entered into for rebuilding in concrete the superstructure over so much of the breakwater as available funds will permit. At the end of the 1919 season 400 lineal feet of the superstructure was completed. Expenditure for both classes of work was about $40,000. During the 1920 season 842 lineal feet of concrete superstructure of breakwater under contract will be completed.

The Steamer Desmond—a "sand-sucker," which sank in Lake Michigan at a point about 700 feet southeasterly of the Calumet Harbor breakwater—was removed during the year in so far as it proved an obstruction to navigation.

Calumet River, Illinois and Indiana.

No dredging or other contract work was done. A special allotment was made for deepening the so-called "rock-cut" of the Main River to a depth of 23 feet below Chicago City Datum, to provide a safe passage for vessels of 20 feet draft, and at the close of the 1919 season a survey of the 1,750 lineal feet of "rock-cut" channel had been made. During the coming season it is proposed to issue specifications for the proposed rock excavation and commence the work thereon.

In conjunction with the above, I wish to call your attention to the fact that Federal maintenance in the North Branch of the Chicago River north of North Avenue terminated with the passage of the River and Harbor Act of March 2, 1919. Since that date no one has assumed the guardianship of that portion of the river as regards improvements. However, the responsibility evidently rests with the City of Chicago. Numerous complaints were received during 1919 directing my attention to shoal areas, and I anticipate even greater difficulty from this source in 1920 unless funds are available to perform the necessary dredging. It is hoped that an appropriation of $50,000 will be granted to the Bureau of Rivers and Harbors in 1920 for the purpose of carrying out such work in the interest of navigation.

WORK DONE BY THE CITY OF CHICAGO.

It is to be regretted that no funds were available for the construction or repair of delapidated street-end docks along the Chicago River and the Lake Front, as this work is of primary importance as a public improvement.

In order to perform what work was necessary, this bureau requested an appropriation of $70,060 for 1920 to be used for that purpose. Only such work was contemplated that was urgently necessary. The present condition of city street-ends is such as to make ridiculous the function of this bureau pertaining to the service of notices upon private owners to rebuild bad docks, for the reason that the city's docks are in most cases in far worse condition than the private docks. This condition should not be overlooked nor neglected.

I am impressed with the necessity of the passage of an ordinance providing "that all docks constructed along the Chicago and Calumet Rivers in the future be constructed of concrete." A great step in advance would thus be accomplished; first, by virtue of the promotion of the "Chicago Beautiful" idea; second, increased and improved docking facilities, and third, permanence.

The Bureau of Rivers and Harbors shares with other branches of the City service in the need of an accurate section-line survey of the Chicago River, including its branches, similar to the survey made of the Calumet River in 1914 by the Division of Surveys. Such a survey would be invaluable to the City of Chicago as an exact and true reference as to the location of existing docks, and would also contain the necessary mathematical data from which to compute proposed dock lines in the future without the expense of isolated surveys. A uniformity of data would result therefrom for the benefit of all. $20,000 would cover both the field and office work of such a survey.

There exists urgent necessity for the construction of a suitable outer breakwater along the Lake Front between 51st Street and 53rd Street, fronting East End Park. The construction of same would add materially to the area of the park as well as to its appearance and would prevent further annoyance and expense as a result of the washouts which now occur whenever the lake is storming.

NOTICES SERVED BY THE HARBOR MASTER.

There were 79 Dock Notices served on owners to repair or rebuild delapidated docks. Eighteen Removal Notices were served to cause the removal of obstructions to navigation. Most of these notices were complied with, but in several cases for non-compliance it was necessary to institute suit, in which instances satisfactory adjustments were effected.

The principal suit was that against a certain Capt. J. J. Wagner for two distinct offenses, viz: 1, allowing two wooden sailing hulls to sink in the North Branch of the Chicago River next south of Belmont Avenue, thereby obstructing navigation; 2, abandonment of two sunken canal boats in the west arm of the south fork of the South Branch Chicago River between 39th Street and South Ashland Avenue. The city's suit was held in abeyance for the reason that the defendant had filed a petition in bankruptcy. Meanwhile the U. S. engineers filed suit in the U. S. District Court against the said J. J. Wagner and the Producers' Material Company—former owners of said sailing hulls and canal boats. The suit was still pending at the close of the year, but the indications are that a favorable adjustment will be reached and the sunken craft removed.

STEAMSHIP DELAYS.

The Steamer Tioga, keel 285 feet, beam 39 feet, draft 17 feet, of 2,320 gross tons, outbound and towed by tug Kenosha, was caught in current while navigating Rush Street draw and lay crosswise of the channel from 1:45 a. m. until 5:55 a. m. on May 20, 1919. Tug Indiana came to assistance and steamer was removed without further difficulty. No damage done to steamer or bridge.

The Steamer Edwin L. Booth, length 413 feet, beam 51 feet, depth 28 feet, of 4,626 gross tons, towed by tugs Kenosha and Racine, on July 15th, was caught by the current while attempting to enter the North Branch of the Chicago River. Steamer lay wedged in between docks next north of and nearly parallel to Lake Street Bridge from 12 o'clock midnight until 12 o'clock noon. It was necessary to have the dam raised at Lockport to lessen the current, after which two tugs, aided by a shore cable, were able to release the steamer. No damage was done to steamer or bridge.

The Steamer Uranus, length 416 feet, beam 50 feet, depth 28 feet, of 4,426 gross tons, towed by tugs Racine and Indiana, was caught by the current in the Main Chicago River on November 23, 1919, and lay crosswise of the channel between Dearborn and Clark Streets from 1:23 a. m. until 3:45 p. m. It was necessary to have the dam raised at Lockport to lessen the current, whence tugs, aided by shore cables, released the steamer. No damage resulted therefrom.

It has been my constant endeavor to conduct the bureau in a manner to reflect credit on the department.

Respectfully submitted,

JAMES J. McCOMB,
Harbor Master.

BUREAU OF STREETS

HON. CHARLES R. FRANCIS,
Commissioner of Public Works.

Dear Sir:

I respectfully transmit herewith annual report of the Bureau of Streets for the year ending December 31, 1919:

GARBAGE.

81,427 tons of garbage were delivered to the Reduction Plant at 39th and Iron Streets by boat and direct haul, of which amount 1,016 tons were collected and delivered by auto trucks; 1,558 tons of private garbage were also delivered, of which amount 786 tons were delivered by boats from the Chicago Avenue and Oakley Avenue loading stations.

Cost of collecting and hauling	$384,205.07
Cost of boat hire	57,144.51
Cost of handling at loading stations	18,428.50
	$459,778.08

There were 1,171 tons of garbage collected in the 9th Ward and hauled to dump at 103rd and Lake Calumet.

Cost of collection and hauling	$8,047.44

Cost per ton, $5.64.
Cost per capita, .172.
Population December 31, 1919, 2,672,292.

ASHES AND MISCELLANEOUS WASTE.

1,628,562 cubic yards, or 353,219 loads, of ashes were collected and delivered to city dumps, of which amount 12,338 cubic yards were collected and hauled by auto trucks; 23,773 cubic yards were spread in alleys which were below grade.

Cost of collecting and hauling	$1,460,502.01
Maintenance of city dumps	64,888.01
	$1,525,390.02

Cost per ton	93c
Cost per capita	57c

PAPER BURNERS.

123,747 cubic yards of paper were burned.

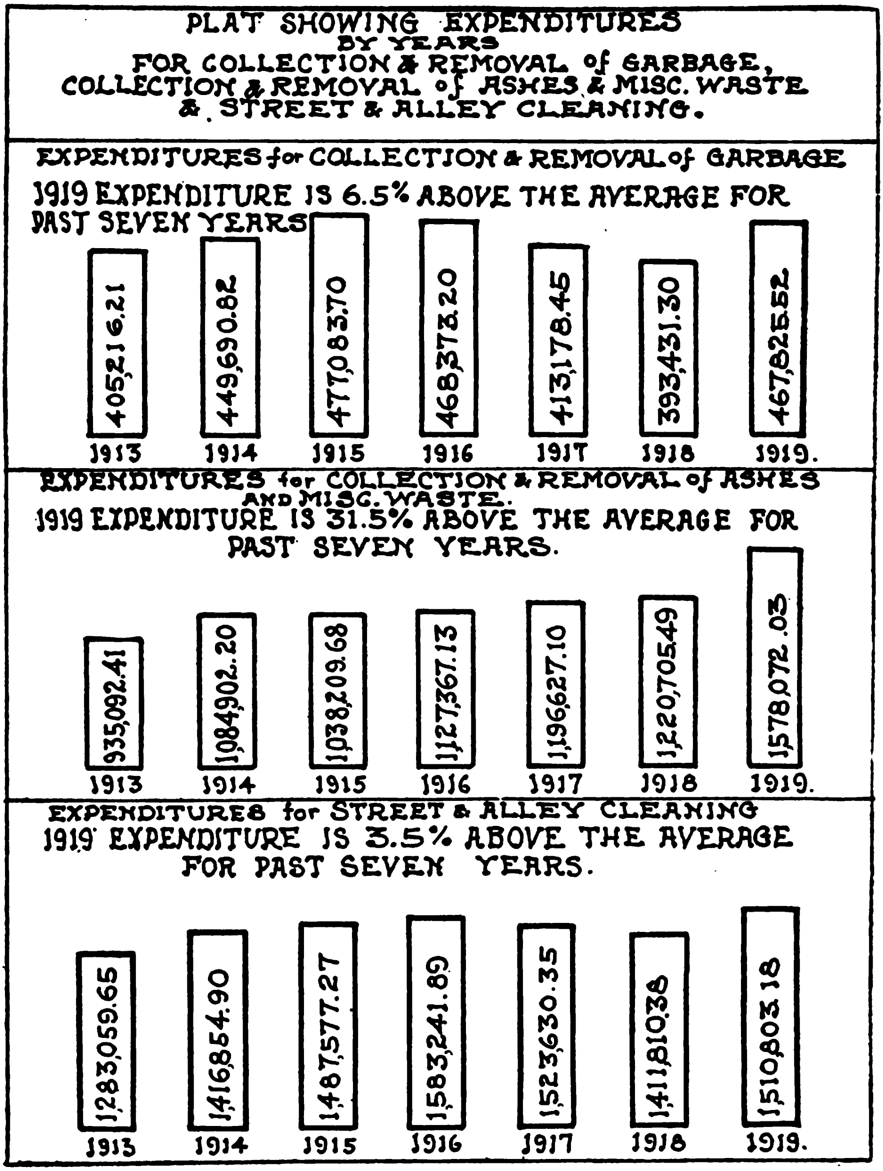
Expense	$52,682.01

STREET CLEANING.

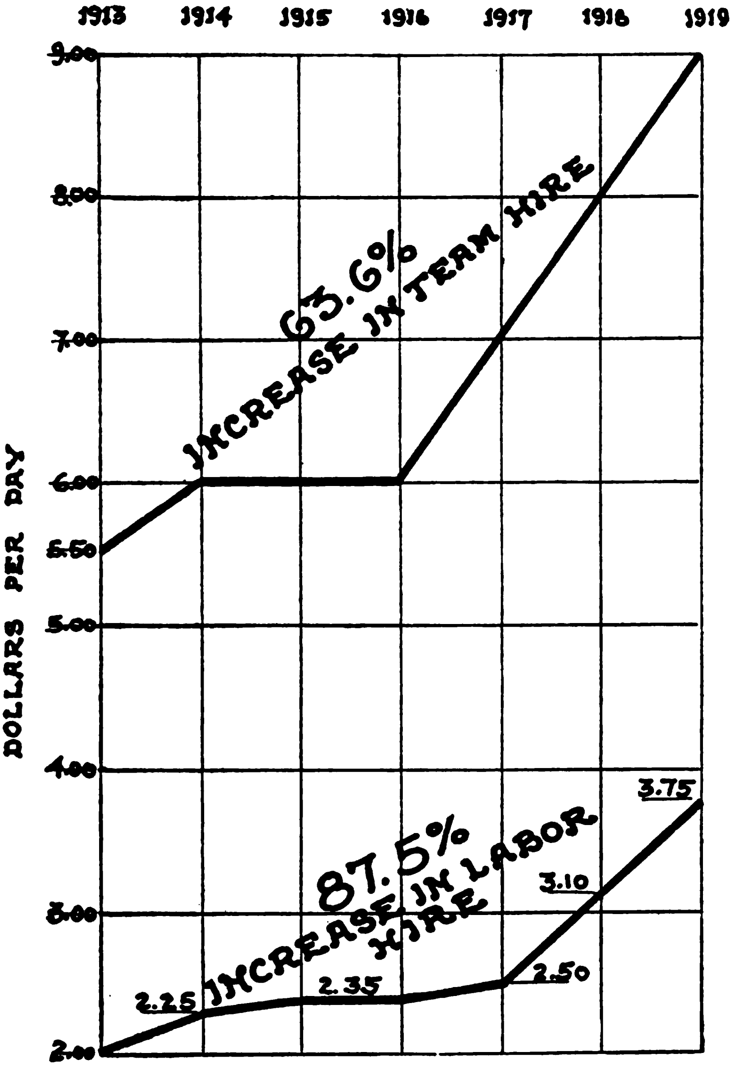
2,667,411,502 square yards of streets were cleaned (block and gang systems); 364,157 cubic yards, or 95,421 loads, of street dirt were collected and removed; 39,085 cubic yards were curbed.

Cost of block and gang cleaning	$1,307,691.88
Cost of material and supplies	32,994.75
Illinois Central Railroad cars for street dirt	5,600.50
	$1,346,287.13

Cost per 1,000 square yards	$.504
Cost per capita	.50


PLAT SHOWING EXPENDITURES
BY YEARS
FOR COLLECTION & REMOVAL of GARBAGE,
COLLECTION & REMOVAL of ASHES & MISC. WASTE
& STREET & ALLEY CLEANING.
EXPENDITURES for COLLECTION & REMOVAL of GARBAGE
1919 EXPENDITURE IS 6.5% ABOVE THE AVERAGE FOR PAST SEVEN YEARS
405,216.21
449,690.82
477,083.70
468,373.20
413,178.45
393,431.30
467,825.52
1913
1914
1915
1916
1917
1918
1919.
EXPENDITURES for COLLECTION & REMOVAL of ASHES AND MISC. WASTE.
1919 EXPENDITURE IS 31.5% ABOVE THE AVERAGE FOR PAST SEVEN YEARS.
935,092.41
1,084,902.20
1,038,209.68
1,127,367.13
1,196,627.10
1,220,705.49
1578,072.03
1913
1914
1915
1916
1917
1918
1919.
EXPENDITURES for STREET & ALLEY CLEANING
1919 EXPENDITURE IS 3.5% ABOVE THE AVERAGE FOR PAST SEVEN YEARS.
1,283,059.65
1,416,854.90
1,487,577.27
1,583,241.89
1,523,630.35
1,411,810.38
1,510,803.18
1913
1914
1915
1916
1917
1918
1919.

PLAT SHOWING THE INCREASE IN WAGE BY YEARS OF LABOR & TEAMS IN STREET CLEANING AND WASTE REMOVAL



AUTO SWEEPERS.

17,991,447 square yards of streets were swept in the 4th, 10th, 13th, 23rd and 27th Wards.
Expense $3,086

AUTO FLUSHERS — FIRST WARD.

82,380,509 square yards of streets were cleaned by auto flushers in the First Ward; 19,336,700 gallons, or 16,990 tanks, of water were used in this activity.

Expense $7,706.05

Cost per 1,000 square yards....................$.093

AUTO FLUSHERS — NINETEENTH WARD.

9,289,180 square yards of streets were cleaned by auto flushers in the Nineteenth Ward; 2,407,900 gallons, or 2,189 tanks, of water were used in this activity.

Expense $562

HORSE-DRAWN FLUSHERS — FIRST WARD.

3,485,184 square yards of streets were cleaned by horse-drawn flushers; 1,739,500 gallons, or 6,011 tanks, of water were used in this activity.

Expense $796

SIDEWALK FLUSHING — FIRST WARD.

11,152,111 square yards of sidewalks cleaned by flushers; 2,777,500 gallons, or 5,565 tanks, of water were used in this activity.

Expense $2,968.60

FLUSHING IN ALL OTHER WARDS.

59,518,332 square yards of street cleaned by flushers; 25,493,350 gallons, or 48,785 tanks, of water were used in this activity.

Expense $11,632.05

SNOW REMOVAL — FIRST WARD.

13,588,196 square yards of streets were cleaned of snow in the First Ward; 70,083 cubic yards, or 14,017 loads, of snow were collected and removed.

Expense $54,092.26

Cost per cubic yard..........................$.77

SNOW REMOVAL IN ALL OTHER WARDS.

7,943,892 square yards of streets cleaned of snow; 51,588 cubic yards, or 9,402 loads, of snow were piled and removed.

Expense $34,350.23

Cost per cubic yard...............................$.66

ALLEY CLEANING.

86,536,674 square yards of alleys were cleaned.

Expense	$49,322.86

WEED CUTTING.

4,003,641 square yards of weeds were cut.

Expense	$4,701.29

DITCHING.

47,700 feet of ditches were opened and cleaned.

Expense	$570.55

EMERGENCY WORK.

Grading, 8,600 feet; New lumber, 64,141 feet; Old lumber, 6,259 feet; Cinders, 3,088 cubic yards; stone, 99 cubic yards; kegs of nails, 8½.

Expense	$12,413.48

DEAD ANIMALS REMOVED.

The Canal Rendering Company removed the following number of dead animals from the streets and alleys during the year 1919 at a cost of $25.00, as per contract:

Horses	3,282
Dogs	12,713

HOUSE MOVING — 1919.

Number of permits issued		158
Dimensions of buildings:		
One-story	74	
Two-story	74	
Three-story	10	158
Character of construction:		
Frame	108	
Brick	50	158
Width—lineal feet		3,493
Division:		
North Side	18	
South Side	53	
West Side	87	158
Amount		$1,272

PERMIT DIVISION

S. J. FISHER, Chief Street Inspector

STATEMENT OF PERMITS ISSUED

City departments		5,655
Individuals (plumbers, sewer builders, etc.)—		
In improved streets	1,049	
In unimproved streets	2,402	3,451
Use of street		498
Peoples Gas Light & Coke Company		9,419
Commonwealth Edison Company		4,716
Chicago Telephone Company		1,440
Chicago Surface Lines		564
Various corporations		371
Inspection		43
Cement sidewalk contractors		99
Driveways		767
Sewer and water mains		116
Miscellaneous		2,231
Total		29,370

CITY DEPARTMENTS.

Number of permits issued		5,655
Number of openings made—		
In improved streets	5,926	
In unimproved streets	2,866	8,792
Number of openings in various kinds of pavement—		
Asphalt	2,226	
Asphaltic-macadam	94	
Brick	811	
Concrete	32	
Creosoted block	187	
Granite	669	
Macadam	1,387	
Cement sidewalks	520	5,926
Cement sidewalk restored, sq. ft		23,000
Pavement restored—		
Asphalt	5,298	
Asphaltic-macadam	4,639	
Brick	3,712	
Concrete	71	
Creosoted block	383	
Granite	2,346	16,449

INDIVIDUALS.
(Plumbers, Sewer Builders, Etc.)

Number of permits issued—		
For openings in improved streets	1,049	
For openings in unimproved streets	2,402	3,451

Individuals—Continued

Number of openings made—		
In improved streets	1,193	
In unimproved streets	4,264	5,457
Number of openings in various kinds of pavement—		
Asphalt	345	
Asphaltic-macadam	50	
Brick	162	
Concrete	14	
Creosoted block	38	
Granite	95	
Macadam	230	
Cement sidewalks	259	1,193
Cement sidewalks restored, sq. ft		16,977
Pavement restored—	sq. yds.	
Asphalt	1,477	
Asphaltic-macadam	1,282	
Brick	1,014	
Concrete	58	
Creosoted block	150	
Granite	806	4,787

PEOPLES GAS LIGHT & COKE COMPANY

Number of permits issued		9,419
Number of openings made—		
In improved streets	11,676	
In unimproved streets	10,175	21,871
New mains installed, miles		27
Number of services installed		6,049
Number of openings in various kinds of pavement—		
Asphalt	3,593	
Asphaltic-macadam	354	
Brick	1,535	
Concrete	37	
Creosoted block	398	
Granite	2,227	
Macadam	2,626	
Cement walks	926	11,696
Cement sidewalks restored, sq. ft		7,200
Pavement restored—	sq. yds.	
Asphalt	7,870	
Asphaltic-macadam	5,457	
Brick	5,142	
Concrete	111	
Creosoted block	1,061	
Granite	4,458	24,099

COMMONWEALTH EDISON COMPANY.

Number of permits issued		4,716
Number of openings made—		
In improved streets	1,972	
In unimproved streets	710	2,682
Conduit and lateral installed, lin. ft		150,331
Conduit and lateral installed, duct ft		771,156
Concrete used, cu. yds		6,955
Number of vaults constructed		1,250
Brick used in vault construction		1,187,528

Commonwealth Edison Company—Continued

Poles set—		
Wood		4,155
Cable installed, miles		90
Wire strung, miles		980
Number of openings in various kinds of pavement—		
Asphalt	408	
Brick	814	
Concrete	70	
Creosoted block	76	
Granite	404	
Macadam	80	
Cement sidewalk	620	1,972
Cemet sidewalk restored, sq. ft.		24,800
Pavement restored—	sq. yds.	
Asphalt	5,716	
Asphaltic-macadam	2,956	
Brick	4,892	
Concrete	291	
Creosoted block	760	
Granite	5,654	14,769

CHICAGO TELEPHONE COMPANY.

Number of permits issued		1,440
Number of openings made—	sq. yds.	
In improved streets	534	
In unimproved streets	1,415	1,949
Conduit and lateral installed, lin. ft.		66,307
Conduit and lateral installed, duct ft.		350,353
Concrete used, cu. yds.		1,906
Number of vaults constructed		166
Brick used in vault construction		250,515
Poles set—		
Wood		1,483
Cable installed, miles		78,762
Wire strung, miles		1,730
Number of openings in various kinds of pavement—		
Asphalt	127	
Brick	188	
Creosoted block	32	
Granite	92	
Macadam	36	
Concrete	59	
Cement sidewalk	4	538
Cement sidewalk restored, sq. ft.		3,327
Pavement restored—	sq. yds.	
Asphalt	1,454	
Asphaltic-macadam	673	
Brick	1,553	
Creosoted block	2,265	
Granite	739	
Concrete	158	
Slag	58	6,900

THE WESTERN UNION TELEGRAPH COMPANY.

Conduit installed, lin. ft.		2,761
Conduit installed, duct ft.		21,257
Number of vaults constructed		24
Number of brick used in underground construction		51,350
Pavement restored—	sq. yds.	
Asphalt	104	
Granite	251	355

POSTAL TELEGRAPH-CABLE COMPANY.

Conduit installed, lin. ft.		19,463
Conduit installed, duct ft.		38,927
Number of vaults constructed		48
Pavement restored—	sq. yds.	
Asphalt	226	
Brick	79	
Granite	33	338

CHICAGO SURFACE LINES.

Number of permits issued			564
Track constructed—			
Rehabilitated—type 2-A	miles	1.49	
Rehabilitated—type 3	miles	1.43	
Rehabilitated—type 3, temporary	miles	0.65	
Rehabilitated—type 4	miles	0.78	
Rehabilitated—type 5	miles	0.66	
Rehabilitated—type 6	miles	0.47	5.48
Extensions—type 3	miles	0.97	
Extensions—type 3, temporary	miles	0.11	
Extensions—type 4	miles	0.32	
Extensions—type 4, temporary	miles	0.17	
Extensions—type 5	miles	0.25	
Extensions—type 6	miles	0.18	2.00
Track resurfaced	miles		48.55
Track replaced on account of sewer work	miles		0.19
Special work installed, number of layouts			29
Ties installed—			
Wood		22,600	
Steel		800	23,400
Poles set—			
Steel		259	
Wood		125	384
Poles reinforced, steel			805
Poles removed, wood			66
Conduit installed, lin. ft.			1,106
Conduit installed, duct ft.			4,809
Concrete used in underground construction, cu. yds.			100
Brick used in underground construction			35,077

Chicago Surface Lines—Continued

Cable installed—

Underground, lin. ft.	9,646	
Overhead, lin. ft.	7,302	
Auxiliary and bonding, lin. ft.	17,792	34,740

Trolley wires strung—

New, lin. ft.	9,646	
Renewals, lin. ft.	902,263	
Repairs, lin. ft.	45,659	957,568

Pavement laid inside right of way—	sq. yds.	
Brick	5,241	
Creosoted block	4,028	
Granite	159,627	
Wood	4,009	172,905

Pavement laid outside right of way	sq. yds.	
Asphalt	1,710	
Brick	6,489	
Granite	3,801	12,000

CHICAGO SURFACE LINES
(Chicago Railways Company)

Track and Paving Reconstructed and Extended during 1919

Street	From	To	Rehabilitated Miles	Extended Miles	Total Miles
18th street	Canal street	State street	0.83	....	
26th street at Rockwell street			0.02	....	
Adams street	Clark street	Wells street	0.25	....	
Arthington street	Kedzie avenue	Spaulding avenue	....	0.21	
Ashland avenue at Augusta street			0.02	....	
Ashland avenue	Cortland street	Grand avenue	3.33	....	
Belmont avenue	Robey street	Sarak avenue	0.35	....	
Blue Island avenue	Harrison street	Western avenue	1.82	....	
Cicero and North avenue car house			0.14	0.29	
Clark street at Chicago river bridge			0.09	....	
Clark street	Division street	Kinzie street	1.94	....	
Clinton street	Harrison street	Roosevelt road	0.46	....	
Elston avenue at Augusta street			0.02	....	
Franklin-Orleans Bridge			....	0.04	
Grand avenue	Rush street	St. Clair street	0.26	....	
Grand avenue	Austin avenue	Harlem avenue	3.40	....	
Halsted street	Chicago avenue	Milwaukee avenue	0.61	....	
Harrison street	Canal street	Clinton street	0.08	....	
Harrison street	Canal street	Chicago river	0.15	....	
Jefferson street	14th street	Roosevelt road	0.43	....	
Kedzie avenue at Argyle street			0.03	....	
La Salle street Tunnel			0.37	....	
Lawrence avenue Bridge			0.26	....	
Madison street	Clinton street	Western avenue	3.48	....	
Milwaukee avenue at Augusta street			0.02	....	
Milwaukee avenue	Desplaines street	Western avenue	1.57	....	
Monroe street river bridge approaches			....	0.14	
State street	Division street	Kinzie street	1.35	....	
Taylor street	Clinton street	Wells street	0.59	....	
Van Buren street bridge and approaches			0.13	....	
Special track work and miiscellaneous construc-ton			0.11	0.44	
Total			22.11	1.12	23.23

Chicago Railways Company—Continued

Track Constructed prior to 1919 which was Paved during 1919

Lake street car shops	0.05	....	
Lawrence avenue bridge and approaches	0.07	....	
			0.12

Track and Paving Reconstructed and Extended during 1919
(Chicago City Railway Company)

Street	From	To	Rehabilitated Miles	Extended Miles	Total Miles
51st street west of Wentworth avenue			0.03	....	
51st street	Shields avenue	Wallace street	0.76	....	
63rd street	State street	Wentworth avenue.	0.40	....	
63rd street	Racine avenue	Stewart avenue	1.57	....	
63rd street	Central avenue	Cicero avenue	1.38	....	
69th street at Leavitt street			0.20	....	
88th street and Vincennes avenue car house			0.01	....	
111th street	Monterey avenue	Cemeteries	2.49	....	
Central avenue	63rd street	63rd place	0.06	....	
Cicero avenue	63rd street	Archer avenue	1.24	....	
Cottage Grove avenue	51st street	71st street	5.08	....	
Monterey avenue	111th street	Vincennes avenue	0.60	....	
Private right of way	Wenthworth avenue south of 83rd street		0.04	0.17	
Racine avenue	67th street	74th street	1.18	....	
South Chicago avenue	71st street	75th street	1.10	....	
Vincennes avenue	89th street	119th street	7.83	....	
Wabash avenue	Congress street	Roosevelt Road	1.05	....	
Wentworth avenue	59th street	Root street	2.69	....	
Special track work and miscellaneous construction			0.34	0.17	
Total			28.68	0.34	29.02

Track Constructed prior to 1919 which was Paved in 1919

42nd street	Ashland avenue	Marshfield avenue	0.07	....	
69th street at Leavitt street			0.01	....	
Total			0.08		0.08

Track and Paving Reconstructed and Extended during 1919
(Calumet & South Chicago Railway Company)

Street	From	To	Rehabilitated Miles	Extended Miles	Total Miles
64th street at I. C. R. R. subway			0.10	....	
95th street at I. C. R. R. subway			0.31	0.52	
106th street	Calumet avenue	Torrence avenue	0.63	....	
115th street at Prairie avenue			0.02	....	
Commercial avenue at 97th street			0.01	....	
Cottage Grove avenue at 104th street			0.02	....	
Private right of way—N. Y. C. & St. L. shops			0.55	....	
South Chicago avenue	79th street	89th street	1.43	....	
Special track work and miscellaneous construction			0.05	0.01	
Total			3.12	0.53	3.65

Track Constructed prior to 1919 which was Paved in 1919

115th street at I. C. R. R. subway			0.04	....	
Stony Island avenue	79th street	81st street	0.04	....	
Total			0.08	....	0.08

(Southern Street Railway Company)

22nd street at Rockwell street			0.03	....	
Special track work and miscellaneous construction			....	0.01	
Total			0.03	0.01	0.04

THE SANITARY DISTRICT OF CHICAGO.

On Prairie Avenue between 114th Place and 120th Place, on 120th Place between Prairie Avenue and Indiana Avenue, and on Indiana Avenue between 120th Place and 124th Place the following work was done:

Reconstructed 300 lineal feet of nine-inch tile sewer.
Rebuilt 56 concrete catch-basins.
Reset 6,192 lineal feet of sandstone and limestone curb.
Constructed 2,533 square yards of concrete base.
Restored 2,638 square yards of brick pavement.
Restored 9,100 square yards of macadam pavement.
Constructed 13,380 square feet of cement walks.

Forty-four thousand cubic yards of surplus dirt were removed from Indiana Avenue between 120th Place and 124th Place.

Five miles of temporary narrow gauge track constructed on 114th Place from Prairie Avenue to South Park Avenue, on South Park Avenue from 114th Place to 103rd Street, on 103rd Street from South Park Avenue to Lake Calumet.. Nine crossings on this line were planked and are being maintained in good condition and guarded by watchmen.
On 114th Place between Prairie Avenue and South Park Avenue the following work was done:

Removed 300 square yards of macadam pavement.
Removed 2,400 square feet of cement walk.
Constructed 1,200 lineal feet of 16-foot concrete sewer.
Removed 1,066 cubic yards of surplus dirt.

CHICAGO UNION STATION COMPANY AND PENNSYLVANIA COMPANY.

Ordinance of March 23, 1914.

The work done in connection with the construction of the Chicago Union Station and the Pennsylvania Freight Terminal is as follows:

Canal Street—Fulton Street to Harrison Street: Repaved 10,214 square yards of granite block pavement.

Polk Street to Taylor Street: Excavated the street to a level averaging about eight feet below the old grade, removing 2,700 cubic yards of dirt; installed a 16-inch water main; completed construction of concrete caissons; installed an 18-inch sewer and built columns, girders and the deck of the upper level street between Gilpin Place and Taylor Street.

Harrison Street—Chicago River to Canal Street: Moved the old viaduct 22 feet north of its original position; built a temporary viaduct connecting the old viaduct and the river bridge; removed 10,000 cubic yards of dirt; constructed 23 caissons and 11 cross girders for the new viaduct.
Canal Street to Clinton Street: Completed curb wall on south side of street; raised the street railway tracks, manholes and catch-basins to proper grade; constructed 1,000 square yards of granite block (temporary) pavement and 2,000 square feet of cement walk.

Polk Street—Chicago River to Canal Street: Completed 18 concrete caissons and 9 cross girders; performed 90 per cent of the work of installing a concrete sewer in the south side of the street between the Pennsylvania Freight Terminal and Canal Street; built temporary wooden trestle approach from Canal Street to the viaduct.

Ferquer Street—Canal Street to Clinton Street: Depressed the sewer, water pipe and gas main to new grade; excavated 2,600 cubic yards of dirt; constructed 700 lineal feet of concrete curb; 1,071 square yards of granite block pavement and 3,200 square feet of cement walk.

Taylor Street—Chicago River to Canal Street: Constructed abutments, 26 concrete caissons and 13 concrete girders; erected the steel work of viaduct and encased same in concrete.

Passenger Station—Constructed concrete curb walls (25 feet in height) on the south side of Adams Street, the north side of Jackson Boulevard, the west side of Canal Street and the east side of Clinton Street; excavated 84,000 cubic feet of dirt and completed 250 concrete piers.

Right-of-Way—East of Canal Street, between Harrison Street and Roosevelt Road: Excavated 30,000 cubic yards of dirt and depressed two main tracks.

CHICAGO & NORTHWESTERN RAILWAY COMPANY.

Franklin-Orleans Street Viaduct and Approaches.

Ordinance of March 25, 1916.

Wrecked and removed the Chicago & Northwestern Railway Company's freight office building at the southeast corner of Kinzie and Orleans Streets and a frame building at the northwest corner of Kinzie and Orleans Streets.

Viaduct—Kinzie Street to the Chicago River: Sewer under the viaduct completed to the dock line. It will be extended a short distance to the north abutment of the bridge. Completed about 90 per cent of the track depression and about 80 per cent of track rearrangement required; 55 per cent of the foundation piles driven; 45 per cent of the concrete foundations and steel columns in place; about 50 per cent of the steel structure erected; 45 per cent of the steel columns and 30 per cent of the beams encased in concrete.

North Approach—Orleans Street from Austin Avenue to Kinzie Street: Piles for the abutment driven; west retaining wall completed; one-third of the filling necessary has been done.

East Approach—Kinzie Street from Wells Street to Orleans Street: Retaining walls and filling completed; eight spans of steel work erected and seven of them encased in concrete; excavation for driveway between Franklin and Orleans Streets completed.

Forty per cent of the sewer between Franklin Street and Orleans Street completed. Reinforced concrete sewer in Franklin Street from a point 20 feet north to a point 30 feet south of Kinzie Street completed. Warehouse platform constructed under the approach.

Chicago & Northwestern Railway Company—Continued

Chicago Surface Lines tracks and wires have been removed from Orleans Street and Kinzie Street from Austin Avenue to a point 150 feet west of Franklin Street. Part of trolley poles have been removed to permanent locations.

Underground equipment of various public untilities have either been removed or moved to temporary locations to allow work to progress.

Track Elevation.

CHICAGO, MILWAUKEE & ST. PAUL RAILWAY COMPANY.

(Evanston Branch)

Montrose Avenue to Howard Street

Ordinance of July 11, 1910

Between Columbia Avenue and Pratt Boulevard—92 feet of retaining wall constructed on the west side of the right of way.

Between Morse Avenue and Lunt Avenue—241 feet of retaining wall constructed on the east side of the right of way.

Between Lunt Avenue and Greenleaf Avenue—125 feet of retaining wall constructed on the west side of the right of way.

Albion Avenue, Sherwin Avenue and Jarvis Avenue—Concrete slab floors were installed on the bridges.

Temporary trestle removed—9,485 lineal feet.

Filling placed upon the right of way—40,000 cubic feet.

CHICAGO, ROCK ISLAND & PACIFIC RAILWAY COMPANY.

Main Line.

From 72nd Street to 90th Street.

Ordinance of July 11, 1910.

The subways at Vincennes Road and at 88th Street were completed. The details of street improvement are as follows:

88th Street—

Concrete curb	235 lineal feet
Brick pavement	650 square yards
Cement walk	2,490 square feet

Vincennes Road—

Concrete curb	86 lineal feet
Brick pavement	775 square yards
Cement walk	1,520 square feet

ILLINOIS CENTRAL RAILROAD COMPANY.

53rd Street to 67th Street.

Ordinance of February 7, 1916.

Reconstruction of Bridges and Subways.

53rd Street—Abutments, piers and deck of bridge (except parapets) completed; sewer, pavement, curbs and walks completed; constructed 89 lineal feet of concrete curb, 1,878 square yards of granite block pavement, and 6,159 square feet of cement sidewalk.

55th Street—Abutments, piers and deck of bridge completed; sewer, pavement, curbs and walks completed; constructed 550 lineal feet of concrete curb, 1,539 square yards of granite block pavement and 8,463 square feet of cement sidewalk.

Illinois Central Railway Company—Continued

57th Street—Abutments, piers and deck of bridge (except parapets) completed; sewer, pavement, curbs and walks completed; constructed 285 lineal feet of concrete curb, 1,969 square feet of asphaltic concrete pavement and 2,099 square feet of cement sidewalk.

59th Street—Abutments, piers and deck of bridge (except parapets) completed; sewer, pavement, curbs and walks completed; constructed 191 lineal feet of concrete combined curb and gutter, 20 lineal feet of concrete curb, 412 lineal feet of concrete gutter, 957 square yards of granite block pavement and 4,533 square feet of cement sidewalk.

60th Street—Abutments, piers and deck of bridge (except parapets) completed; sewer, pavement, curbs and walks completed; constructed 700 lineal feet of concrete combined curb and gutter, 51 lineal feet of concrete curb, 408 lineal feet of concrete gutter, 1,346 square yards of asphaltic concrete pavement and 1,000 square yards of granite block pavement.

63rd Street—Subway completed; constructed 44 lineal feet of concrete curb and 978 square feet of cement sidewalk.

64th Street—Abutments, piers and deck of bridge completed; sewer, pavement, curbs and walks completed; constructed 273 lineal feet of concrete curb, 973 square yards of granite block pavement and 5,486 square feet of cement sidewalk.

65th Street—Abutments, piers and deck of bridge completed; sewer, pavement, curbs and walks completed; constructed 365 lineal feet of concrete curb, 1,059 square yards of granite block pavement and 7,677 square feet of cement sidewalk.

67th Street—Abutments, piers and deck of bridge completed; sewer, pavement, curbs and walks completed; constructed 100 lineal feet of concrete curb, 681 square yards of granite block pavement and 3,724 square feet of cement sidewalk.

82nd Street to Kensington Avenue.
Ordinance of April 5, 1911.

Subways

95th Street—Abutments and piers completed; temporary deck laid on bridge; part of the sewer, pavement, curb and sidewalk work done; constructed 1,442 lineal feet of concrete curb, 343 square yards of granite block pavement, 2,483 square yards of brick pavement and 9,960 square feet of cement sidewalk.

100th Street—Abutments, piers and bridge completed.

109th Street—Abutments, piers and bridge completed.

111th Street—Abutments, piers and deck of bridge completed; sewer, pavement, curbs and walks completed; constructed 156 lineal feet of concrete curb, 10 square yards of granite block pavement and 2,466 square feet of cement sidewalk.

113th Street—Abutments, piers and deck of bridge completed; sewer, pavement, curbs and walks completed; constructed 72 lineal feet of concrete curb, 177 square yards of granite block pavement and 3,938 square feet of cement sidewalk.

115th Street—Abutments, piers and deck of bridge completed; sewer, pavement, curbs and walks completed; constructed 171 lineal feet of concrete curb, 565 square yards of granite block pavement and 1,725 square feet of cement sidewalk.

Kensington Avenue—Abutments, piers and deck of bridge completed; sewer completed; part of pavement, curb and sidewalk work done; constructed 100 lineal feet of concrete curb, 244 square yards of granite block pavement and 969 square feet of cement sidewalk.

PENNSYLVANIA LINES.
(P. C. C. & St. L. R. R.)

39th Street to 71st Street.
Ordinance of April 22, 1912.

Subways

Completed the steel work and about 75 per cent of the concrete decking of bridges across 65th Street, 67th Street, 68th Street and 69th Street.

Completed the rough grading of roadways and sidewalk areas in subways in above named streets.

Constructed 50 lineal feet of concrete curb in the south side of 69th Street.

BALTIMORE & OHIO CHICAGO TERMINAL RAILROAD COMPANY.

39th Street to 71st Street.
Ordinance of April 22, 1912.

Subways

Constructed 630 lineal feet of concrete curb and 3,600 square feet of cement sidewalk in the subway in 69th Street. This constitutes about 85 per cent of the curb and sidewalk work which this company is required to do in that subway.

Completed rough grading for roadways and walks in 65th Street and 68th Street subways.

CHICAGO & NORTHWESTERN RAILWAY COMPANY.
(Wisconsin Division)

Irving Park Boulevard to Foster Avenue.
Ordinance of December 29, 1913, as Amended.

Foster Avenue Subway—Bridge work completed.

Number of Openings Made in Improved Streets During 1919.

Asphalt	7,674	
Asphaltic-macadam	578	
Brick	3,347	
Concrete	244	
Creosoted block	841	
Granite	4,010	
Macadam	5,012	
Cement sidewalks	2,742	24,448

Pavement and Sidewalks Restored.

Where Opened by City Department and Individuals During 1919.

	sq. yds.	
Asphalt	6,775	
Asphaltic-macadam	5,921	
Brick	4,726	
Concrete	129	
Creosoted block	533	
Granite	3,152	21,236
Cement sidewalks, sq. ft.		39,977

Pavement, Sidewalk, Combined Curb and Gutter, Concrete Curb and Curb Walls.

Constructed by Public Utility Companies During 1919.

	sq. yds.	
Asphalt	20,395	
Asphaltic-macadam	9,086	
Brick	29,442	
Concrete	560	
Creosoted block	8,114	
Granite	196,369	
Macadam	9,100	273,066
Cement walk, sq. ft		119,694
Combined curb and gutter, lin. ft		891
Concrete curb, lin. ft		11,611
Curb wall, lin. ft		1,666
Concrete gutter, lin. ft		820

STATEMENT OF EARNINGS.

Permit Division.

Openings, A and B permits, restoration charge	$ 32,946.41
Openings, A and B permits, inspection charge	1,195.00
Use of street, F permits, use of street charge	3,694.00
Inspection (miscellaneous) E permits, charges	884.50
Sidewalk contractors, K permits, charges	2,475.00
Warrants for collection issued on account of restoration of pavement	172,434.37
Total	$213,629.28

VEHICLE TAX DIVISION

MR. OTTO CEDERWALL,

Third Assistant Superintendent in Charge.

The Bureau of Streets carried out the repair program for 1919 with a view to giving its first attention to general repairs of the various kinds of pavement under its jurisdiction. It is natural to expect that the unit costs for such work will be much higher than formerly, due to the increased cost of labor and material.

With the addition of 112 miles of pavements which have been released by the Board of Local Improvements the Bureau of Streets now maintains a yardage which, if considered a roadway of 30 feet in width, would extend a distance of 1,884 miles. The bureau now maintains approximately 75 per cent of all paved streets and alleys in the city.

PAVEMENTS ON STREETS AND ALLEYS

Out of Reserve During 1919 and Falling to the Bureau of Streets to Repair, Beginning January 1, 1920.

Kind	sq. yds.	Mileage
Asphalt	744,486	43.06
Brick	531,008	37.50
Creosoted block	139,568	9.98
Bituminous concrete	55,148	5.90
Granite block	43,981	2.90
Concrete	22,695	2.37
Asphaltic-concrete	126,016	8.08
Asphaltic-macadam	40,268	2.36
Total	1,703,110	112.15

STREET REPAIRS.

The following kinds and quantities of different materials were used upon the streets and by the Asphalt Plants in the work of repair and maintenance of the pavements of the City of Chicago:

Brick, thousand	431,250
Granite block, sq. yds	1,176
Creosoted block, sq. yds	6,381
Crushed limestone, cu. yds	19,406
Torpedo sand, cu. yds	767
Bank sand, cu. yds	546
Asphalt sand, cu. yds	12,683
Paving gravel, cu. yds	2,011
Asphalt, tons	4,534
Stone dust, tons	435
Cement, bbls.	7,840
Road oil, gals.	589,805
Fuel oil, gals.	180,311
Flux oil, gals.	284,692
Gasoline, gals.	91,415

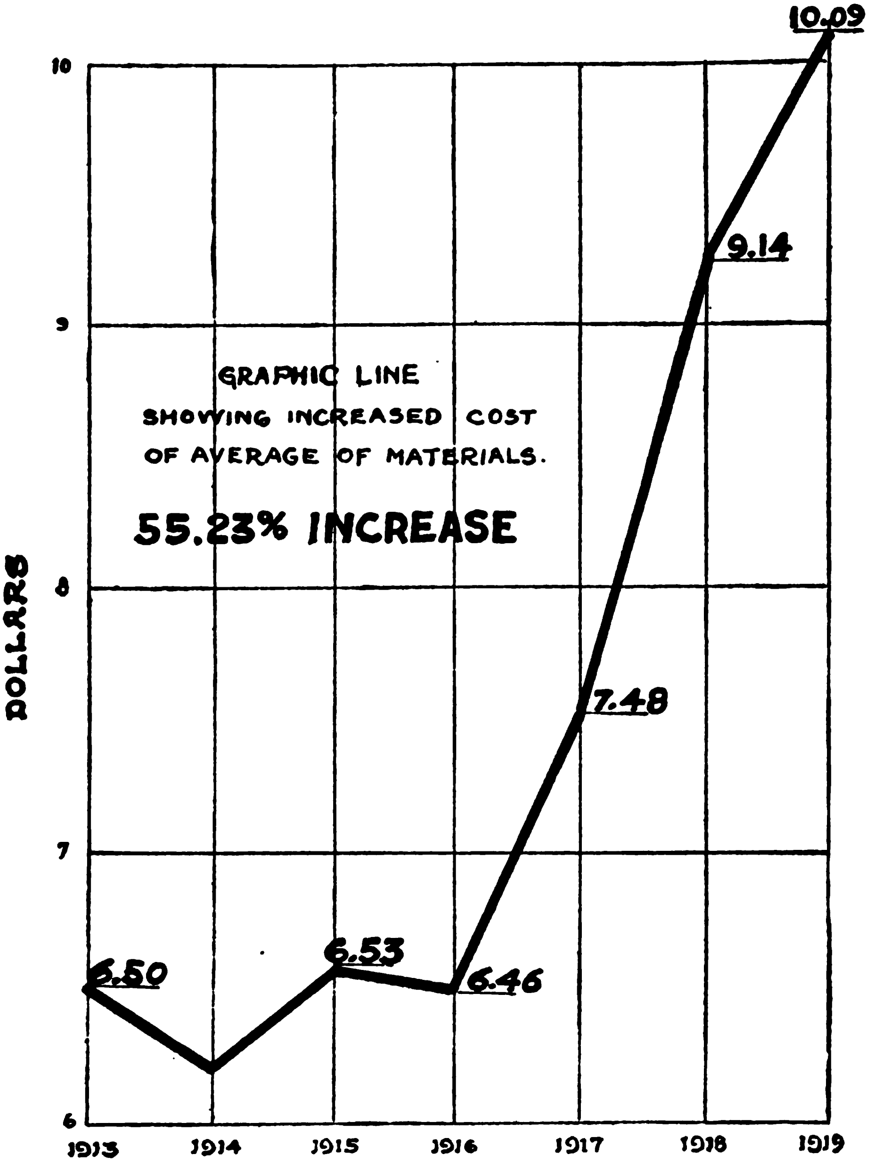
MACHINERY.

During the year 1919 the purchase of the following machinery was made for use in connection with street repairs and maintenance of pavements:

1 concrete mixer for sidewalk, curb and gutter repairs;
4 asphalt tool heaters for heating asphalt paving tools;
10 combination sand and stone heaters for macadam repairs.

COST OF MATERIAL BY YEARS

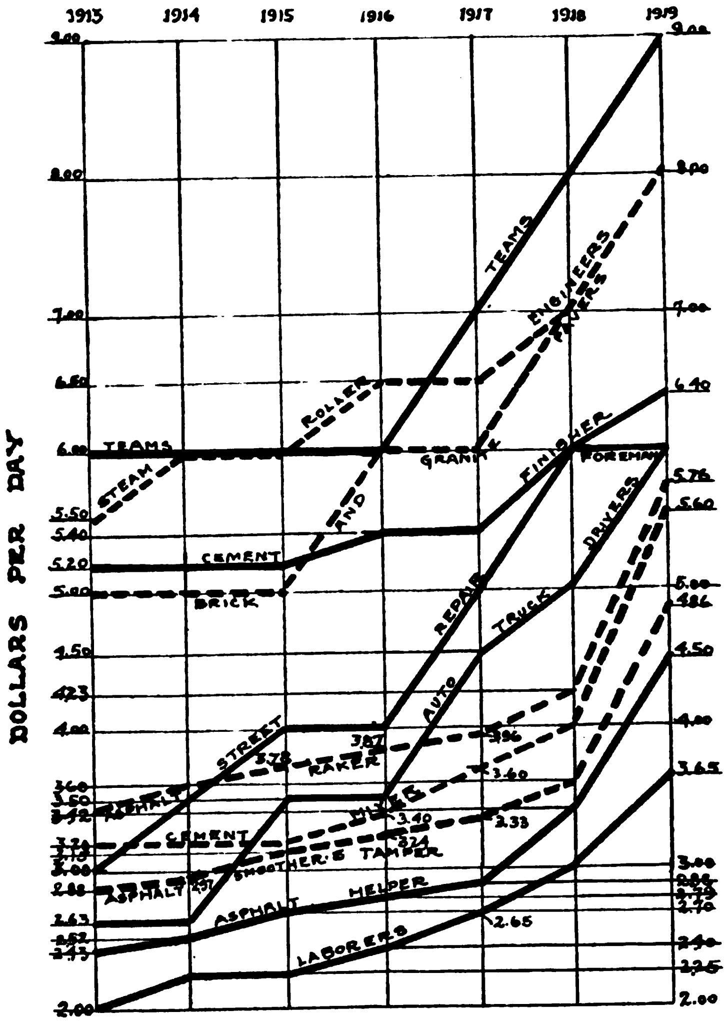
	1913	1914	1915	1916	1917	1918	1919
Crushed Limestone	$ 1.40	$ 1.28	$ 1.40	$ 0.89	$ 1.37	$ 1.10	$ 1.10
Paving Brick	16.00	16.10	17.46	17.50	19.00	22.75	27.50
Granite Block	1.65	1.44	1.60	1.57	1.64	1.82	2.04
Cement	1.60	1.53	1.51	1.66	2.06	2.15	3.00
Asphalt	21.70	20.00	20.70	20.70	24.03	32.56	32.42
Paving Gravel	1.95	1.79	1.80	1.65	2.50	2.25	2.65
Bank Sand	1.25	1.19	1.27	1.25	1.75	1.35	1.97
Average	$ 6.50	$ 6.17	$ 6.53	$ 6.46	$ 7.48	$ 9.14	$10.09



PLAT SHOWING THE INCREASE IN WAGE BY YEARS OF LABOR

VEHICLE TAX DIVISION

BUREAU of STREETS.



AVERAGE INCREASE 63.5%

TOTAL YARDAGE OF DIFFERENT PAVEMENTS REPAIRED

by the Bureau of Streets from 1914 to 1920

Pavement	Number of Square Yards 1914	1915	1916	1917	1918	1919
Sheet Asphalt	142,088	122,786	144,280	123,387	115,657	151,029
Brick	66,416	47,949	49,714	54,882	45,266	43,130
Granite Block	84,661	47,893	73,732	83,469	72,278	54,268
Water-bound Macadam	471,119	880,125	763,497	528,167	562,845	345,246
Concrete	....	9,994	....	....	....	....
Creosoted Block	734	6,940	6,907	5,529	3,912	9,865
Asphaltic-concrete	....	....	....	....	....	15,546
Sheet Asphalt Resurfacing	8,659	8,532	....	....	9,289	....
Asphaltic-concrete Resurfacing	231,068	197,659	125,927	70,574	45,526	35,460
Macadam Resurfacing	362,143	136,907	43,281	....	9,690	23,752
Macadam oiled	6,276,504	6,293,124	6,066,398	5,473,957	7,027,000	6,666,134
Total	7,643,392	7,751,909	7,273,736	6,339,965	7,891,463	7,344,430

STREETS RESURFACED

The following streets were resurfaced with Macadam at a total cost of $4,062.67, or an average cost of $0.17 per square yard.

Street	From	To	Sq. Yds.
Bishop	47th	49th	1,666
Justine	51st	52nd	2,100
Lincoln	47th	48th	1,666
Marshfield	47th	48th	2,600
103rd	Longwood Drive	Western avenue	5,800
111th	Halsted	Vincennes avenue	9,920
Total			23,752

Graded and Penetrated with A. C. Filler

Indianapolis avenue	Ewing avenue	107th	13/16 mile

At a cost of $6,844.68

Proportionate share of cost of grading and resurfacing with Asphaltic Concrete the following named streets in the Clearing District.

Street	From	To	
Cicero avenue	59th	63rd	$15,016.53
Kolmar avenue	59th	60th	
59th street	Kolmar avenue	Belt Railway	
60th street	Kolmar avenue	Hamlin avenue	

The following streets were resurfaced with Asphaltic Concrete at a total cost of $68,842.93, or an average cost of $1.94 per square yard.

Street	From	To	Sq. Yds.
Congress	West line of Racine avenue	22.5 feet east of alley between Peoria and Green	10,181
Elston	Le Claire	Lawrence	10,962
Ohio	Central	Parkside	1,603
State	95th	103rd	11,013
33rd	Stewart	Canal	1,701
Total			35,460

The followi
cost of $1.90 per

Street
Halsted........
Lincoln........
Milwaukee.....
Ohio..........
Vincennes......
Western.......
95th...........
Total

On differ

Pavement
Sheet Asphalt ...
Brick...........
Creosote Block..
Water-boundMac am Oiled......
Granite Block...
Asphaltic Concre
BitumenatedConc
Asphaltic Macad
Concrete........

Of the 11,464
with Road Oil at

OUTPUT OF ASPHALT PLANTS

Detail of Cost

Plant No. 1

Top 9,074.25 Tons at $9.514	$ 86,336.10
Binder 7,484.4 Tons at $6.889	51,556.16
Asphaltic-concrete 5,569.9 Tons at $7.481	41,666.75
	$179,559.01

	TOP		BINDER		ASPHALTIC-CONCRETE	
	Cost per Ton	Total Cost	Cost per Ton	Total Cost	Cost per Ton	Total Cost
Labor	$2.2337	$20,269.15	$2.2337	$16,717.90	$2.2337	$12,441.49
Teams	.2410	2,186.89	.2410	1,803.74	.2410	1,342.35
Material	7.0397	63,880.06	4.4150	33,044.52	5.0060	27,882.94
Total	$9.5144	$86,336.10	$6.8897	$51,566.16	$7.4807	$41,666.78

Plant No. 2

Top 619.125 Tons at $8.3133	$ 5,147.31
Binder 648. Tons at $6.55	4,244.91
Asphaltic-Concrete 2,317.245 Tons at $6.303	14,606.06
	$23,998.28

	TOP		BINDER		ASPHALTIC-CONCRETE	
	Cost per Ton	Total Cost	Cost per Ton	Total Cost	Cost per Ton	Total Cost
Labor & Hauling	$3.2488	$2,011.71	$3.249	$2,105.35	$3.249	$7,528.77
Material	5.0645	3,135.60	3.301	2,139.56	3.054	7,077.29
Total	$8.3133	$5,147.31	$6.550	$4,244.91	$6.303	$14,606.06

Plant No. 3

Top 335 Tons at $10.148 per ton	$ 3,399.90
Binder 280 Tons at $7.275 per ton	2,036.82
Asphaltic-Concrete 2,897.5 Tons at $7.77 per ton	22,515.24
	$27,951.96

	TOP		BINDER		ASPHALTIC-CONCRETE	
	Cost per Ton	Total Cost	Cost per Ton	Total Cost	Cost per Ton	Total Cost
Labor	$3.018	$1,011.03	$3.018	$ 845.04	$3.018	$ 8,744.65
Teams	.392	131.32	.392	109.76	.392	1,135.82
Material	6.738	2,257.55	3.865	1.082.02	4.360	12,634.77
Total	$10.148	$3,399.90	$7.275	$2,036.82	$7.77	$22,515.24

1919 VEHICLE TAX COLLECTIONS AND EXPENDITURES

Collections 1919	Expenditures 1919	
$1,368,940.68	Bureau of Streets	$ 962,165.82
	Bureau of Engineering	50,000.00
	Bureau of Sewers	16,000.00
	City Collector	17,500.00
	City Clerk	9,870.99
	Comptroller	584.90
	Police Department	7,500.00
Total		$1,063,621.71

The collections and expenditures from the Vehicle Tax Fund for the years 1908 to 1920 are shown below:

Year	Collections	Total Expenditures
1908	$ 440,253.93	$ 433,056.33
1909	504,197.75	506,298.99
1910	566,191.57	501,392.18
1911	591,147.08	576,195.54
1912	603,282.70	562,358.55
1913	682,135.10	719,105.39
1914	730,536.81	813,980.42
1915	768,027.78	792,022.50
1916	992,717.86	874,470.83
1917	1,135,650.76	1,055,019.93
1918	1,134,761.17	1,277,820.13
1919	1,368,940.68	1,063,621.71

Of this amount of $1,063,621.71 representing expenditures of the Vehicle Tax Fund, $962,165.82 was expended by the Bureau of Streets in the repair and maintenance of streets and alleys.

Respectfully submitted,

THOS. H. BYRNE,
Superintendent of Streets.

BUREAU OF WASTE DISPOSAL

HON. CHAS. R. FRANCIS,
Commissioner of Public Works.

Dear Sir:

I respectfully submit herewith the annual report for the year 1919:

The raw garbage receipts for the year totaled 82,816 tons, a decrease of 2,158 tons, or 2.5 per cent under those of 1918, 17,330 tons, or 17.3 per cent under those of 1917, and 51,476 tons, or 38.3 per cent under those of 1916.

3,893,360 pounds of garbage grease were produced during the year, and 3,559,960 pounds were sold at an average of 5.76 cents per pound for a total of $204,831.73. 14,623.89 tons of garbage tankage were produced, while 15,045.89 tons were sold for $102,814.57. The receipts for garbage rags, tin cans, bones, animal grease, hides and miscellaneous scrap totaled $13,939.85.

The gross receipts from the sale of products of the Municipal Reduction Plant equaled $321,586.15, and, allowing for a decrease of inventory of $35,536.04 at the end of the year, resulted in a net revenue of $286,050.11, against an operation expense of $548,687.54. This shows a loss of $262,637.43 in the operation of the Municipal Reduction Plant, due partly to the increase in the cost of labor and supplies and also to the general decline in market conditions following the termination of the war.

Construction and rehabilitation work during the year at the Municipal Reduction Plant amounted to $108,866.04, which was paid out of the Waste Disposal Building and Equipment Bond Fund and the Health Department Bond Fund for the completion of the garbage plant. The most important items of expenditure from the bond funds included the completion of the contracts for the equipment of the new extraction building and the new boiler house. The new extraction building is nearly completed and will be ready for operation soon, while the new boiler house is entirely equipped, with the exception of the piping and pumps.

At the Bridewell Incinerator, which is under the jurisdiction of this bureau, 16,833 tons of South Water Street refuse were burned during the year, at an operation cost of $17,711.99.

The Reduction Plant is now operated in a sanitary and inoffensive manner, and no complaints have been registered, either by residents or enterprises, during the period of municipal operation. It is customary for civic organizations, women's clubs and university classes to visit the plant during the summer months of the year when garbage is most offensive and when the plant is taxed to its capacity.

The following tables will show in detail the activities of this bureau during the year 1919.

Respectfully submitted,
HARRY S. TOWLE,
General Foreman in Charge,
Bureau of Waste Disposal.

BUREAU OF WASTE DISPOSAL—MUNICIPAL REDUCTION PLANT

TABLE No. I

Detailed Statement of Raw Garbage Receipts during the Year 1919 As compared with 1918

Months	Raw Garbage Receipts, 1919 Tons	Number of Boxes Used	Average Tonnage per Box	Raw Garbage Receipts, 1918 Tons	Increase in 1919 Tons	Decrease in 1919 Tons	Per cent of Increase or Decrease in 1919
January...........	5,858	3,169	1.85	2,388	3,470	....	145.3
February..........	5,000	2,937	1.70	4,347	653	....	15.0
March.............	5,499	2,973	1.85	6,051	....	552	9.1
April.............	5,966	3,111	1.92	6,222	....	256	4.1
May...............	6,550	3,314	1.98	7,434	....	884	11.9
June..............	7,130	3,277	2.17	8,374	....	1,244	14.8
July..............	7,864	3,343	2.35	9,503	....	1,639	17.2
August............	9,820	4,676	2.10	10,079	....	259	2.6
September.........	9,583	4,040	2.37	9,268	315	....	3.4
October...........	9,140	3,845	2.37	8,141	999	....	12.3
November..........	5,970	2,852	2.09	6,882	....	912	13.3
December..........	4,436	2,736	1.62	6,285	....	1,849	29.4
Totals.......	82,816	40,273	2·05	84,974	5,437	7,595 5,437	
Net Decrease...	....	....	....	....	....	..2,158...	.... 2.5%

TABLE No. II

Detailed Statement of Garbage Grease and Tankage Produced and Material Recovered during 1919

Months	Garbage Grease Produced Pounds	Garbage Tankage Produced Tons	Garbage Rags Recovered Tons	Tin Cans Recovered Tons	Animal Grease Produced Pounds	Garbage Bones Recovered Tons	Miscellaneous Scrap Recov. Tons
January...........	271,080	1,101.87	24.85	20.69	2,450	24.70	..........,
February..........	186,000	942.25	3.70	36.80	1,750	29.60	....
March.............	264,000	1,232.30	26.77	44.70	2,636	22.40	....
April.............	252,420	1,299.48	20.86	....	2,450	....	....
May...............	273,660	1,277.84	28.08	....	1,400	19.10	101.70
June..............	323,160	1,391.80	36.33	....	3,850	47.15	....
July..............	294,380	1,170.95	21.32	....	1,624	30.55	....
August............	344,740	1,371.25	23.87	....	700	56.05	....
September.........	350,140	1,537.40	20.43	....	1,400	59.15	24.05
October...........	355,580	1,423.05	50.22	....	1,750	35.15	....
November..........	237,860	1,054.30	26.60	....	1,050	34.05	....
December..........	240,340	821.40	22.35	....	2,100	51.80	16.65
Totals—1919...	3,393,360	14,623.89	305.38	102.19	23,160	409.70	142.40
Totals—1918...	3,198,177	15,780.10	292.42	591.72	23,973	....	78.42

TABLE No. III

Detailed Statement of Revenue from Sale of Grease, Tankage and Miscellaneous Products during 1919

Months	Garbage Grease	Garbage Tankage	Garbage Rags	Garbage Tin Cans	Garbage Bones	Animal Grease	Miscellaneous	Totals
January	$ 26,932.71	$ 12,644.24			$ 494.00			$ 40,070.95
February	13,581.77	3,934.40			577.20			18,093.37
March		4,999.80			436.80	$ 744.30		6,180.90
April	9,736.80	6,756.97	$ 497.93	$ 204.39				17,196.09
May	15,153.75	10,109.80			382.00			25,645.55
June	20,745.90	8,610.16	187.76		943.00			30,486.82
July	27,372.45	5,950.79	579.63		611.00	648.38	$ 838.15	36,000.40
August	21,301.35	10,721.14			1,121.00			33,143.49
September	29,261.95	9,857.89			1,183.00			40,302.84
October	12,079.05	11,781.02	406.81		703.00			24,969.88
November	16,052.30	9,672.50	183.83		681.00		405.23	26,994.86
December	12,613.70	7,775.86			1,036.00		1,075.44	22,501.00
Totals—1919	$ 204,831.73	$ 102,814.57	$ 1,855.96	$ 204.39	$ 8,168.00	$ 1,392.68	$ 2,318.82	$321,586.15
Totals—1918	$ 331,736.96	$ 193,659.48	$ 2,631.73	$ 1,183.44		$ 1,842.49	$ 4,484.49	$535,538.59

TABLE No. IV

Detailed Statement of Operation Expenditures during 1919

Months	Salaries and Wages	Fuel Oil	Power and Light	Coal	Supplies and Repairs	Totals
January	$ 21,324.90	$ 7,110.60	$ 1,323.90	$ 4,174.79	$ 5,752.29	$ 39,686.48
February	19,196.56	6,177.57	1,062.80	3,479.36	8,020.21	37,936.50
March	21,957.25	5,935.86	908.20	3,191.39	6,552.28	38,544.98
April	20,398.62	5,343.48	874.80	2,099.24	7,743.82	36,459.96
May	21,293.94	4,463.80	1,116.00	4,058.78	8,791.17	39,723.69
June	21,970.71	4,723.04	1,122.70	2,470.26	11,722.45	42,009.16
July	52,540.71	5,774.31	1,346.20	1,894.94	11,797.70	73,353.86
August	32,701.96	6,562.99	1,754.50	3,539.29	13,846.57	58,405.31
September	30,494.77	6,676.32	1,680.10	2,754.70	13,487.22	55,093.11
October	28,843.49	5,681.76	1,741.00	3,772.47	9,727.31	49,766.03
November	22,845.49	4,174.36	1,099.70	3,113.89	9,297.04	40,530.48
December	22,696.37	4,066.91	896.40	3,148.54	6,369.76	37,177.98
Totals—1919	$ 316,264.77	$ 66,691.00	$ 14,926.30	$ 37,697.65	$ 113,107.82	$ 548,687.54
Totals—1918	$ 259,817.78	$ 86,500.26	$ 14,800.90	$ 34,672.80	$ 93,778.26	$ 489,570.00

TABLE No. V

Detailed Statement of Unit Cost of Operation per Ton of Raw Garbage during 1919

Months	Salaries and Wages	Fuel Oil	Power and Light	Coal	Supplies and Repairs	Totals
January	$3.640	$1.214	$ .226	$ .713	$ .982	$6.775
February	3.839	1.236	.212	.696	1.604	7.587
March	3.993	1.079	.165	.580	1.192	7.009
April	3.419	.895	.147	.352	1.298	6.111
May	3.215	.681	.170	.620	1.342	6.064
June	3.081	.662	.157	.347	1.644	5.891
July	6.681	.734	.171	.241	1.500	9.327
August	3.330	.668	.179	.360	1.410	5.947
September	3.182	.697	.175	.288	1.407	5.749
October	3.156	.622	.190	.413	1.064	5.445
November	3.827	.699	.184	.522	1.557	6.789
December	5.116	.917	.202	.710	1.436	8.381
Totals—1919	$3.819	$ .805	$ .180	$ .455	$1.366	$6.625
Totals—1918	$3.057	$1.018	$ .174	$ .408	$1.104	$5.761

TABLE No. VI

Detailed Statement of Revenue and Expenses During the Year 1919

By-product and Miscellaneous Shipments:

Garbage Grease	341,680	pounds	@	$.1186	per pound	$ 40,514.48	
Garbage Grease	364,140	pounds	@	.0400	per pound	14,565.60	
Garbage Grease	242,940	pounds	@	.0425	per pound	10,324.95	
Garbage Grease	1,675,720	pounds	@	.0525	per pound	87,975.30	
Garbage Grease	935,480	pounds	@	.0550	per pound	51,451.40	
Animal Grease	14,886	pounds	@	.05	per pound	744.30	
Animal Grease	10,374	pounds	@	.0625	per pound	648.38	
Hides	760	pounds	@	.26	per pound	197.60	
Garbage Tankage	502.15	tons	@	10.25	per ton	5,147.04	
Garbage Tankage	890.72	tons	@	10.00	per ton	8,907.20	
Garbage Tankage	12.0	tons	@	12.00	per ton	144.00	
Garbage Tankage	208.45	tons	@	8.00	per ton	1,667.60	
Garbage Tankage	168.00	tons	@	7.50	per ton	1,260.00	
Garbage Tankage	2,577.50	tons	@	7.00	per ton	18,192.50	
Garbage Tankage	211.6	tons	@	6.75	per ton	1,442.30	
Garbage Tankage	1,675.75	tons	@	6.50	per ton	10,994.44	
Garbage Tankage	7,339.47	tons	@	6.25	per ton	46,255.99	
Garbage Tankage	1,460.25	tons	@	6.00	per ton	8,803.50	
Tankage (Unmilled Degreased)	874.90	tons	@	1.50	per ton	1,312.37	
Garbage Tin Cans	102.19	tons	@	2.00	per ton	204.39	
Garbage Rags	206.2145	tons	@	9.00	per ton	1,855.96	
Garbage Bones	52.	tons	@	19.50	per ton	1,014.00	
Garbage Bones	357.7	tons	@	20.00	per ton	7,154.00	
Scrap Metal	66.8	tons	@	6.00	per ton	400.80	
Scrap Metal	34.25	tons	@	7.00	per ton	239.75	
Scrap Metal						168.30	
Total Revenue Vouchered							**$321,586.15**

Table No. VI—Continued

Plus Inventory of December 31, 1919, as follows:

Garbage Grease	175,000	pounds	@ $ .055	per pound	$ 9,625.00	
Animal Grease	7.700	pounds	@ .0625	per pound	481.25	
Hides	390	pounds	@ .26	per pound	101.40	
Unmilled Degreased Tankage	3,125	tons	@ 4.00	per ton	12,500.00	
Garbage Bones	20	tons	@ 20.00	per ton	400.00	
Garbage Rags	99.175	tons	@ 9.00	per ton	892.58	
Scrap Iron	16.65	tons	@ 10.00	per ton	166.50	
Total Inventory of December 31, 1919						24,166.73
Total Revenue and Inventory						$345,752.88

Less Inventory of December 31, 1918, as follows:

Garbage Grease	341,597	pounds	@ $ .1157	per pound	$ 39,522.77	
Animal Grease	9,800	pounds	@ .10	per pound	980.00	
Garbage Tankage	300	tons	@ 10.00	per ton	3,000.00	
Garbage Bones	10	tons	@ 20.00	per ton	200.00	
Unmilled Degreased Tankage	4,000	tons	@ 4.00	per ton	16.000.00	
Total Inventory of December 31,1918						$ 59,702.77
Total Revenue for 1919						$286,050.11

Operating Expenses:

Salaries and Wages	$316,264.77	
Fuel Oil	66,691.00	
Power	13,660.00	
Light	1,266.30	
Coal	37,697.65	
Supplies and Repairs	113,107.82	
Total Operating Expenses for 1919		$548,687.54

Total Loss on Operation of the Municipal Reduction Plant During 1919	$262,637.43
Total Profit on Operation of the Municipal Reduction Plant During 1918	82,878.91
Total Loss on Operation of the Municipal Reduction Plant During 1917	31,011.69
Total Loss on Operation of the Municipal Reduction Plant During 1916	75,948.85

UNDERGROUND SERVICE SYSTEMS

HON. CHARLES R. FRANCIS,
Commissioner of Public Works.

Dear Sir:

The work of locating and platting underground structures has been conducted during 1919 on the same small scale as heretofore.

During the year all street openings in the loop have been covered and information obtained as to changes and existing locations of underground structures exposed.

To date substructures have been located in a section of the downtown district having an area of seventy acres. Plats have been drawn for an area of sixty acres, which comprises the district between Couch Place on the north, Arcade Place on the south, Wells Street on the west and Wabash Avenue on the east.

Now that the new Transportation Commission has taken up the study of subways, this work assumes an added importance, as the information being collected and assembled by this organization will have to be obtained for the whole subway district in advance of any subway construction.

Respectfully submitted,
JOHN E. CLEARY,
Secretary and Engineer,
Commission on Downtown
Municipal Improvements.

The following table shows, in detail, the surface and subsurface locations recorded on complete drawings:

Lineal feet of curb	21,475
Lineal feet of trolley tracks	64,025
Lineal feet of building lines	27,210
Miles of streets and alleys	2.2
Tunnels	4
Hydrants	38
Poles, etc., on sidewalks	190
Elevated columns	30
Sewer catch basins	167
Sewer inlets	81
Sewer manholes	142
Gas drip pot pipes	37
Water valve basins	141
Fire cisterns	5
Commonwealth Edison manholes	240
Chicago Telephone Company manholes	67
Chicago Surface Lines manholes	32
Postal Telegraph Company manholes	14
Western Union Telegraph Company manholes	16
Chicago Postal Pneumatic Tube Company manholes	2
Sanitary District manholes	4
City Press Association manholes	20
City Lighting manholes	64
Coal holes	48
Total manholes	962
Street openings	811

SUBSURFACE STRUCTURES

Itemized Statement of Length of Substructures shown on completed Plats

UTILITY	Vitrified Tile Duct	National and Stone Duct (Duct Ft.)	Tube Mains	Dorset Composition Duct	Pump Log	Iron Pipe Conduit	Pneumatic Tubes	Total
Commonwealth Edison Co.	116,246	114,363	20,435	3,596	1,860	20,669	....	277,169
Chicago Telephone Co.	169,063	4,460	....	....	295	7,599	....	181,417
Chicago Surface Lines	47,625	....	....	....	....	30	....	47,655
Western Union Telegraph Co.	8,620	....	....	....	3,840	....	....	12,460
Postal Telegraph Co.	14,600	....	....	....	....	....	....	14,600
City Press Association	....	....	....	....	....	....	42,645	42,645
Chicago Postal Pneumatic Tube Co.	....	....	....	....	....	....	1,645	1,645
City Lighting	27,007	....	505	....	....	6,275	....	33,787
Sanitary District	3,732	....	....	....	....	....	....	3,732
Total	386,893	118,823	20,940	3,596	5,995	34,573	44,290	615,110

UTILITY	Iron Pipe											Tile Pipe			Brick Sewer				Total
	1 ½-in.	3-in.	4-in.	6-in.	8-in.	10-in.	12-in.	16-in.	20-in.	30-in.	36-in.	9-in.	12-in.	15-in.	24-in.	27-in.	30-in.	36-in.	
Sewer	......	......	......	......	......	......	......	......	......	......	......	3,880	5,295	175	1,105	1,020	3,340	105	14,930
Water	......	......	50	2,380	11,446	705	6,078	......	56	......	720	......	......	......	......	......	......	......	21,444
Gas	10	155	11,550	19,990	4,690	1,170	1,540	900	5,780	80	......	......	......	......	......	......	......	......	45,835
Total	10	155	11,600	22,370	16,136	1,875	7,618	900	5,815	80	720	3,880	5,295	175	1,105	1,020	3,340	105	82,209

Grand Total—Length of Substructures Platted .... **697,319 Feet.**

Territory for which Plats are completed: Wells Street to Wabash Avenue, Couch Place to Arcade Place.

MUNICIPAL PIER

HON. CHAS. R. FRANCIS,
Chairman Harbor Board, and Commissioner of Public Works.

Dear Sir:

I herewith respectfully transmit the fourth annual report on the activities of the Municipal Pier for the fiscal year ending December 31, 1919:

The Municipal Pier of the City of Chicago has now been thoroughly established as a business and recreational enterprise, with a financial return that has lifted the pier from a liability to a respectable asset.

The recreational end of the pier is, and will probably continue to be, a seasonal activity, as its construction is such as to render successful heating well-nigh impossible. Its popularity in the summer time is in direct proportion to the height of the temperature and demonstrates the truth of the oft-repeated statement by His Honor the Mayor, that "the lake is Chicago's mightiest asset and God's greatest gift to her people."

During the past season, from Decoration Day to Labor Day, with the exception of a short period when transportation was paralyzed, the pier was patronized by approximately four million people, and the Grand Avenue car line, which has improved in service with each succeeding year, was often taxed to its fullest capacity.

For this reason, as well as for the accommodation of the commercial interests on the pier, it would seem highly desirable to get an extension of the Chicago Avenue street car line down Fairbanks Court, as well as to secure an extension of the elevated railroad system, from Clark Street (North Water Street Terminal). Also, the imperative necessity suggests itself of widening Grand Avenue from Dearborn Street to Fairbanks Court, part of which has already been done by the boulevard link improvement.

While the plan of public entertainments supplied by band concerts, dancing and special programs of the Civic Music Association and the Drama League have met with undoubted success in the past, I believe that still greater benefits could be achieved by concentrating these various efforts, thus giving full day activities during the greater part of the week and leaving one or two days open for the accommodation of programs of merit not only of a civic and patriotic character but to meet the ever increasing demand for the use of the pier for convention purposes.

I would further suggest that an amount between five and ten thousand dollars be set aside for the purchase of a good pipe organ to be placed in the auditorium, where it can be put to excellent use at times when a band is not available.

It is very gratifying to once more report that out of about five hundred emergency cases treated at the pier hospital there was not a single one of a serious nature and not any which resulted from lack of precautions on the part of the pier management.

During the past year the commercial section of the pier was leased to its full capacity to the Federal Government for motor transport storage purposes on the basis of twenty cents per square foot. The total amount of revenue derived from the commercial section of the pier was $145,125.87.

It will be observed that on the present basis of rental, however, acceptable that it may be at this time, the commercial section of the pier cannot hope to measure up to its expectations either financially or from the standpoint of the purpose for which it was built.

The prime and foremost object of the pier was and is to centralize passenger and package traffic on the first unit of what it was hoped would develop into an outer harbor for the City of Chicago and to afford a proper receiving station for a comprehensive lighterage system that may be developed with the advent of fixed bridges.

Whether or not this comprehensive outer harbor for Chicago is feasible along the lines originally conceived, it is nevertheless necessary for the best interests of the pier as well as for the city, that insistent and perseverant efforts be made to bring all of the existing passenger boat business over to the pier, and, if necessary, extraordinary measures should be adopted to bring this about. As a condition precedent it will doubtless be necessary to enlarge the transportation facilities as above mentioned, and to build a protecting breakwater on the north side, similar to the one on the south side.

It is believed that the pier is adequate to serve the passenger and package freight business of the City of Chicago for a number of years to come. It is quite likely that other piers of a similar nature, such as produce piers, will be constructed in the future, resulting in an outer harbor which will contribute much to the enjoyment as well as to the lighter commerce of the city. But there can be no doubt that the real commercial harbor of the city is destined to be located at Lake Calumet when the latter shall have been adequately developed.

Many regrets have been expressed from time to time concerning the decrease in the amount of tonnage that passes up the Chicago River, and its consequent diversion to South Chicago, Indiana Harbor, Gary, etc.; but it should be borne in mind that the sum total of the tonnage that passes into the harbors which are tributary to Chicago is vastly in excess of what its normal increase had been if traffic had continued at the mouth of our river. Broadly speaking, we have lost nothing by this change.

Under this new arrangement, we are not taking in our heavy freight at the front door, but are slipping it in from the sides, where the facilities for handling it are better and where it causes less congestion.

Unquestionably also, the railroads have usurped much of our former light water traffic, but these railroads, properly systematized and supplemented with underground approaches to the heart of the city, will serve their purpose in due time. Lake commerce will then again come into its own by reason of adequate harbor facilities which will materially reduce the cost of transfer and prevent the railroads from successfully competing with long distance waterborne transport.

In this connection it may be stated that the next meeting of American Port officials will be held at Chicago duing the fall of 1920, on which occasion many interesting features of lake commerce pertaining to the welfare of this and other cities on the Great Lakes and the St. Lawrence River will be discussed.

The attached table of Revenue and Expense is submitted:

MUNICIPAL PIER

Revenue

	Received from Tenants	Received from Dockage	Received from Concessionaire	Refunds
1916	$ 9,000.00	$4,855.00	$12,525.60	
1917	21,841.66	4,178.60	19,364.40	
1918	37,706.00	6,491.91	26,975.26	$7,225.71
1919	145,092.13	6,060.82	35,454.15	6,061.05

Expense

(Cost of Operation and Maintenance)

1916 (six months)	$45,760.00
1917	70,684.60
1918	70,806.20
1919	97,765.00

Respectfully submitted,

HUGO KRAUSE,

Superintendent.

BUREAU OF PARKS, PUBLIC PLAYGROUNDS AND BATHING BEACHES

HON. CHAS. R. FRANCIS,
Commissioner of Public Works.

Dear Sir:

I submit, herewith, annual report for year ending December 31, 1919:

This bureau has jurisdiction over 68 small parks, 72 playgrounds, 5 bathing beaches, 4 natatoriums, city forestry and municipal nursery.

PARKS.

The small parks vary in size from a one-tenth of an acre beauty spot to a large forty-acre park and athletic field. Lawns, trees, shrubs, walks, drives, fountains and comfort stations were kept in good condition, while sports and recreational activities were promoted to the fullest extent. Play apparatus, tennis courts, baseball diamonds and football fields were patronized extensively by the public. In the winter a number of the parks were flooded for skating.

Diversey Parkway on Diversey Boulevard, near Seminary Avenue, was completed during the year. New water systems were installed in the parkway in front of Clarendon beach and in Roberts Square. Shrubs and trees were planted in the William Hale Thompson playground.

At the Municipal Nursery all buildings and barns were repainted. 1,600 bushels of corn, 400 bushels of oats and 10 tons of hay were harvested. 14,000 seedling trees were planted in the nursery. 10,000 shrubs and 2,000 trees were dug and planted around the parks, playgrounds, bathing beaches and natatoriums under the jurisdiction of this bureau.

At Holden Park the old Cicero Town Hall, formerly used as a police station, was taken over and refitted as a community center. A new floor was laid in the large hall and new plumbing fixtures and furniture installed. The building was painted throughout the inside and a 75-foot flag pole erected in front. This building now is in great demand for use by the people of that community for civic welfare meetings, lectures, dances, dramatics, musicals and a variety of social gatherings.

At the store yard a new building was constructed to care for the repairs of lawnmowers, lawnsweepers, power lawnmowers and tools. A greenhouse 20 feet by 60 feet was constructed, with potting shed in connection. All flowers used in planting of parks, playgrounds and beaches are to be grown in this greenhouse.

FORESTRY.

An emergency crew on an auto truck took care of 1,625 requests for the trimming and removal of dead and dangerous trees in all parts of the city. 1,000 inspections were made, and advice given on the planting and care of trees to hundreds of citizens upon their personal application, through the mail or by telephone. 4,000 trees were sprayed for the tussock moth caterpillars with power sprayers. In Irving Park a crew of men trimmed 6,060 trees and removed 300 dead trees.

PLAYGROUNDS.

Three new playgrounds were added during the year — the Cooper, 18th Place, between Ashland Avenue and Paulina Street; Whittier, 23rd and Lincoln Streets, and the Resin Orr, Keeler Avenue and Thomas Street.

There are now seventy-two playgrounds in operation, fifty-seven of them being located in school yards and operated in connection with the public schools. Fifteen are established on leased or city-owned property. The total attendance for the year for all grounds was 11,861,105. This attendance is secured by estimating the number of persons attending each playground every morning, afternoon and evening session, the total being taken as the attendance each day. The average daily attendance for one ground was approximately 325 children. Of the total attendance it is estimated that 50 per cent were boys, 42 per cent girls, 5 per cent men and 3 per cent women. 33 per cent attended during the morning, 49 per cent during the afternoon and 18 per cent during the evening. The grounds are open each week day from 8:30 a. m. to 9:00 p. m. and from 1:00 to 6:00 p. m. on Sundays and holidays. Each ground is supervised by one Director (man), one Assistant Director (woman) and one Attendant (man).

The activities for boys and men, in addition to the great variety of informal games that were played under the direction of the Playground Director, included leagues and tournaments in the following organized games and sports which were conducted throughout the eight districts of the city, established in 1918 for competitive purposes.

Playground Ball:

During the spring and summer months there were fifty-seven local leagues in playground ball organized in as many playgrounds for grammar school boys, involving 318 teams, for which pennants were awarded to the winning team. These teams later represented their respective playgrounds in the 8 district leagues, and the first team in each district qualified to enter the championship tournament, which was held on Saturday, August 19th, and was won by the Robey playground.

Track and Field:

The annual Track and Field Meet was held in a similar manner in the 8 districts of the city and the finals held Saturday, September 30th, at Sears-Roebuck athletic field. Former playground records were broken in the 220-yard dash and broad jump in the grammar school division and the 100-yard dash, high jump and 440-yard dash in the open division.

Skating:

The annual Skating Tournament was held on Saturday, February 8th. The tournament this year was open to the skaters representing the various park districts in addition to the municipal playgrounds, thereby increasing the number of contestants. Because of the fine weather that prevailed after the district meets were held, the finals were held in the Chicago Arena. 3,074 contestants took part in this tournament representing 48 playgrounds and 14 parks. The championship was won by the Swift municipal playground.

Wrestling:

In the annual Wrestling Tournament 2,500 young wrestlers took part after the usual precaution of having each contestant examined by physicians assigned for that purpose by the Department of Health before being permitted to compete. A noteworthy feature of this tournament is the fact that of the large number of contestants, only four boys were rejected for physical defects.

Efficiency Tests:

The official playground merit button, awarded for athletic efficiency for several years, was again used effectively for stimulating interest in athletic activities, and although the standards in the various events were made more difficult than before, 33 per cent of the boys and young men taking part succeeded in scoring the required number of points to win the button.

The activities for girls and women included skating, indoor class work during the winter, and athletics, games, folk-dancing, hand work, story-telling, club meetings and dramatics the year round. Athletic efficiency tests were conducted monthly at all grounds, and on October 11, 1919, athletic meets for girls were held in 8 districts, 297 girls who had qualified in local tests competing in group events. During October 4 district leagues in volley ball were completed, 16 teams taking part.

More than 500 arm-bands were awarded to winners of the new Girls' Athletic Emblem, designed to tell the story, in symbolic form, of a girl's athletic record in the playground.

Hikes and outings to the Forest Preserve, the beaches and other points of interest formed part of the summer activities. 199 such trips were conducted during the season, 4,221 girls taking part.

Groups from several playgrounds took part in various festivals, pageants and dramatic work, the exhibits being given at the Municipal Pier and in various parks. The Fourth Annual West, North and South Side Play Days were held in Garfield, Lincoln and Washington Parks, respectively, on June 21st.

The increased use of music, both in connection with class-work and neighborhood celebrations, has stimulated the attendance and enthusiasm of the patrons of the playgrounds, particularly where the people are of many nationalities. A series of 16 concerts were given by the Chicago Band in various playgrounds remote from the larger parks. These concerts were very successful and brought music to the people who never were able to go great distances to the larger parks.

BATHING BEACHES AND SWIMMING POOLS.

The bathing beaches and swimming pools were patronized by a larger number of people than ever before, despite the fact that the month of August was very cool. The attendance at the four beaches was 692,377, the natatoriums 429,694, and the protected street-ends 621,149, a total of 1,743,220.

At Clarendon beach, although suits and towels were given this year to children only, our adult attendance and revenue was equal to that of last year, showing that it is not necessary for the city to supply this service. The season was very successful and no serious accident or drowning occurred.

The Wm. Hale Thompson playground, situated immediately north of and adjoining Clarendon beach, was operated for the first time, and gave the children of this locality the first playground on the lake. During the winter a skating pond was formed in the playground, which proved very popular.

About August 1, 1919, the old Rogers Park Pumping Station, at the foot of Kenilworth Avenue, was taken over and converted into a bathing beach. A temporary basket system for checking clothes was installed at a very low cost, with a capacity of 1,000 baskets. It is proposed to enlarge this beach and install lockers for next season.

At 51st Street considerable damage was done by the storms, necessitating rebuilding the eastern portion of the beach. Several thousand tons of rock were placed in and on the old Morgan Pier, and a new cement walk and sea-wall installed, which effectively resisted further storms.

At Rainbow Park beach the dilapidated old buildings were removed, the entire property from 75th to 79th Streets regraded, and a new shore line formed. Four jetties 350 feet long, made of piling and Wakefield sheeting, were placed about 350 feet apart from 76th to 78th Streets. As soon as they were completed they not only stopped the erosion, which had carried away acres of land, including sidewalks, streets and gas and water mains, but through the action of the seas gave back, in one season, more land than had been washed away in three years previous. The waves threw back into the newly formed pockets clean, washed sand, better than was there originally. One of these jetties has also been placed in front of East End Park, and work has been started on several more at Clarendon and Rogers Park beaches.

Street-end bathing has become so popular that a number of street-ends surpass in attendance some of the established, equipped bathing beaches. These places are attended almost entirely by the people of the neighborhood. A large number of them are protected by city lifeguards, and it is a notable fact that no drowning has occurred at any street-end since the lifeguards have been placed there.

At the Beilfuss and Jackson natatoriums new white enameled brick floors were installed. It is proposed to place another one at the Griffith natatorium. The natatoriums, which are used extensively throughout the year, have become fixed in the popularity of the public and they are patronized so extensively that it is proposed that more of them be built throughout the west, northwest and southwest sides of the city.

Respectfully submitted,

WALTER WRIGHT,
Secretary, Bureau of Parks,
Playgrounds and Bathing Beaches.

DIRECTORY OF PARKS, SQUARES, TRIANGLES AND COMFORT STATIONS

NAME	ACRES	LOCATION	IMPROVEMENTS
Adams Park	2	75th place, 76th street, Dobson avenue.	General landscape features, drinking fountain, tool house; surface of lawn depressed for skating.
Aldine Square	1.5	Vincennes avenue, 37th place and alley north of 38th street.	Lagoon with running water in center of landscape.
Arcade Park	.9	111th place, 112th street, Forrestville avenue and Watt avenue.	Lawn, flower beds and big elm trees.
Auburn Park	6	Bounded by Lagoon avenue, Stewart avenue, Winneconne avenue and Normal avenue.	Consisting of small lakes, three bridges, large trees and flowering shrubs; tool house.
Austin Park	4.5	Waller avenue, C. & N.-W. R'y, Austin avenue and Lake street.	Lagoon, with bridge, for wading; house with dressing rooms and lavatories for boys and girls; lawn tennis courts; extensive plantation and three drinking fountains.
Avers Avenue Parkway	....	From West Addison street to Avondale avenue.	Trees, shrubs and lawns.
Arbor Rest	.33	North State street, Rush street, Bellevue place.	Lawn, trees, shrubs and flower beds enclosed by iron fence; shelter house.
Archer Point	.15	Archer avenue, 20th street, Dearborn street.	General landscape features, large ornamental fountain, drinking fountain for men and beasts; bordered by iron fence.
Amy L. Barnard Park	1.25	North side, 105th street between Longwood boulevard and Walden parkway.	General landscape features; play apparatus; tennis courts; wading pool and tool house; shrubs and trees.
Bickerdike Square	1	Ohio street, Bickerdike street, Ashland place, Armour street.	Two water basins, planted with lilies; one larger central basin with water play; drinking fountain; lawns, trees and shrubbery surrounded by iron fence ornamented with flower vases.
Blackstone Point	.2	Lake Park avenue, Blackstone avenue, 49th street	Trees, shrubs and lawn.
Buena Circle	.5	Buena avenue and Kenmore avenue.	One large ornamental fountain; two drinking fountains; general landscape features.
Belden Triangle	.2	North Clark street, Sedgwick street, Belden avenue.	Lawn with trees and shrubs enclosed with iron fence, drinking fountain for men and beasts.
Calumet Parkway	1.50	Calumet avenue, 63-61st street.	Trees, shrubs; tool house; tennis courts.
Chamberlin Triangle	.27	Greenwood avenue, Lake Park avenue, 43rd.	Lawn, perennial borders and shrubbery enclosed by iron fence.
Columbus Circle	.5	South Chicago avenue, Exchange avenue, 92nd street.	The Drake Columbus Memorial Fountain. Site ornamented with low hedge and flower beds.
Colorado Point	.25	Colorado avenue, Monroe street, Francisco avenue.	Lawn with fountain and drinking fountain; trees and shrubs; fountain surrounded by iron fence decorated with flower vases.
Crescent Park	8	Crescent road, Prescott avenue, Ormonde avenue and Grassmere road.	
Dickinson Park	1.5	North Lavergne avenue, Dickinson avenue, Belle Plaine avenue.	Tool house and driveway; elm trees have been planted; shrubs, lawns.
Dauphin Park	5.12	87th street, I. C. R. R., 91st street and Dauphin avenue.	500 trees, 8,000 shrubs, tennis courts, 20'x26'; repair shop.
Douglas Monument Park	3	Woodland Park, I. C. R. R., 35th street, alley west of railway.	Stephen A. Douglas monument; drinking fountain and general landscape features; tool house.
DeKalb Square	.75	Lexington street, Hoyne avenue, Flournoy street, DeKalb street.	Ornamental fountain in center of landscape. surrounded with iron fence.
Diversey Parkway	1.50	Diversey avenue and Seminary avenue.	Shrubs, trees, lawns, flower beds and drinking fountains.
East End Park	10	East End avenue, 51st street, 53rd street, Lake Michigan.	General landscape features; drinking fountain; tool house, tennis courts and comfort stations; supply room for entire park system.
Eldred Grove	1	Norwood Park avenue and C. & N.-W. R'y from Argyle to Ainslie street.	Lawn with trees and tennis courts.

DIRECTORY OF PARKS, SQUARES, TRIANGLES AND COMFORT STATIONS—Continued

NAME	ACRES	LOCATION	IMPROVEMENTS
Ellis Park	4	36th street, 37th street, Langley avenue, Elmwood court.	General landscape features, 2 ornamental fountains; 1 drinking fountain and comfort station.
Eighty-seventh Street Parkway	5	In 87th street from C. R. I. & P. R'y to Eggleston avenue.	Trees, shrubs and lawn, skating; tennis courts.
Eugenie Triangle	.2	Eugenie street, N. Clark street, LaSalle avenue.	Lawn with trees and groups of shrubbery.
Fernwood Park	8	103rd street, 95th street, Stewart avenue, Eggleston avenue.	Lawns, trees, shrubbery and wading lagoon; tool house.
Gage Farm	160	Bounded by 22nd street on the north and 26th street on the south. The east section line is 1,400 feet west of Oak Park avenue, extending west 4,000 feet. (Outside City limits.)	Consists of farm land on which a municipal nursery is being established. Crops of hay and corn also produced.
Graceland Triangle	.2	Malden avenue and Montrose boulevard.	Shrubs and flowers.
Gross Park	.5	On Otto street, between East Ravenswood and Paulina street.	Lawn, trees and shrubs.
Green Bay Triangle	.2	Chestnut street, Rush street, Cass street.	Lawn, trees, shrubs and flower beds enclosed with iron fence.
Harding Avenue Parkway	3	In Harding avenue, between Addison street and Byron avenue.	Lawn and shrubs; graded so as to permit flooding for winter sport; tool house.
Holden Park	4	Lake street, Ferdinand street, Central avenue, Parkside avenue.	General landscape features, drinking fountain for men and beasts; band stand, and two halls furnished for cummunity centers.
Higgins Road Triangle	....	Higgins road and Milwaukee avenue.	Ornamental concrete drinking fountain.
Irving Park	.35	C & N. W. R'y, Irving Park boulevard, near 42nd avenue.	Lawn with plantation; artesian well with pump.
Kedzie Park	3	Kedzie avenue, between Palmer place and North avenue.	Lawns, trees and shrubbery protected at the ends with iron fences.
Kinzie Parkway	1.25	Kinzie street, between Laramie avenue and Long avenue.	Lawn, trees and shrubbery.
Lawrence Avenue Triangles (4)	.8	On Lawrence avenue, between Clark and Broadway avenue.	Shrubs and flowers and trees.
Linden Park	.9	Avondale avenue, C. & N. W. R'y, from School street to Belmont avenue.	Trees, shrubs and lawn.
Maplewood Triangle	.2	Schubert and Maplewood avenues and C. & N. W. R'y.	Lawn and shrubs.
Merrick Park	6	Pine avenue, Long avenue, Ferdinand street and Kinzie street.	Landscape with large lawn and meadow for lawn tennis;two drinking fountains; tool house and comfort station.
McKenna Triangle	.3	38th street, Archer avenue, Campbell avenue.	Three small drinking fountains; lawn, trees and surrounded by hedge and iron fence.
Montrose Point	.2	Montrose avenue, Sheridan road, Broadway.	Lawn and Shrubbery.
Mulberry Point	.4	Nickerson avenue, Nina Street, Nicollet.	Lawn, trees and shrubbery.
Myrtle Grove	1.5	Neva avenue, Ninnewa avenue, Hood avenue.	Lawn, trees and shrubs
Normal Park	2.5	67th street, 69th street, Lowe avenue, C. & W. I. R. R.	Lawn tennis courts, trees and groups of shrubbery and two drinking fountains.
Norwood Circle	2.5	Neva avenue, Peterson avenue, Circle avenue.	General landscape features, tool house, tennis courts, drinking fountain.
Oakland Park	.75	Lake Park avenue, 39th street, I. C. R. R.	General landscape features; drinking fountain.
Ogden Arrow	.4	North Clark street, Wells street, Ogden front.	Lawn, trees and shrubbery guarded by iron fence,

Patterson Park	.2	Leavitt street, Boone street, DeKalb street.	Lawn bordered with trees and shrubs, large fountain in center, enclosed by iron fence between brick posts, capped with flower vases.
Pullman Park	.6	111th street, 111th place, Cottage Grove avenue and Forrestville avenue.	Lawn, trees and shrubbery.
Ravenswood Parkway	1.75	East Ravenswood avenue, between Lawrence and Berteau avenues.	Lawn, trees and shrubs.
Rice Triangle	.2	Western avenue and Grand avenue.	Lawn with large fountain, trees and shrubs enclosed with iron fence; drinking fountain.
Rocky Ledge Park	3.25	79th street and Lake Michigan.	Adjoins Rocky Ledge Beach; walks encircling the lawns bordered with groups of shrubbery and trees. Outer borders consist of a dense plantation of trees and shrubs. A shore promenade is established by a stone wall built at the water's edge. There are two drinking fountains.
Roberts Square	5	Winnemac avenue, North Laramie avenue, Argyle street, North Lockwood avenue.	General landscape features, tennis courts, tool house.
Rutherford Park	4.33	Palmer street, North Newland avenue, North Oak Park avenue, C. M. & St. P. R. R.	Large lawn, extensive planting of trees and shrubs, large wading lagoon; macadam driveway crossing lagoon over wooden bridge on concrete walls; drinking fountain.
Sacramento Avenue Parking	.2	26th street, Sacramento avenue and House of Correction.	Lawn bordered with trees and shrubs and enclosed with iron fence; drinking fountain.
Salt Creek Park	32.64	Salt Creek and C. B. & Q. R. R. at Brookfield. (Outside City limits.)	Unimproved woodland on banks of Salt Creek at Brookfield.
Schoenhofen Place	.3	Canal street, Canalport avenue, 18th street	Public comfort station, ornamental fountain, drinking fountain for men and beasts; trees and flowers.
Stony Island Parkway	8	Stony Island avenue, 69th to 79th streets.	Lawn, trees and shrubbery; tool house 10'x14'.
Twenty-second Street Parkway	3.5	In 22nd street from 40th avenue to 46th avenue.	Lawn, trees and shrubbery.
The Midway	1.5	Midway, between Waller avenue and Austin avenue.	Lawns, trees and shrubbery.
The Lily Gardens	2.4	Lowe avenue, C. & W. I. R. R., 71st street, 73rd street.	Landscape with two large water basins planted with lilies, surrounded partly by hedges and partly by iron fence between brick posts, capped with flower vases; two drinking fountains.
The Railway Garden	2.5	Avondale avenue, Nettleton avenue, and Raven street, south of C. & N.-W. R'y, also on Norwood Park avenue, north of C. & N.-W. R'y.	Landscape with flower beds, drinking fountain for men and beasts.
Washington Square	3	North Clark street, Walton place, N. Dearborn street, Delaware place.	Landscape with large ornamental fountain, including one for men and beasts; comfort station and tool house, brick, 4 drinking fountains.
West End Parkway	1.4	In West End avenue from Menard avenue to Austin avenue, North Waller avenue, Parkside avenue.	Lawns, trees and shrubbery.
Winnemac Park	40	Robey street, Foster avenue, Argyle street and Leavitt street.	Flag pole, 2 drinking fountains, lawns, shrubbery, six baseball diamonds, football field, tennis courts, play apparatus. Leased from the Board of Education. Tool house and comfort station.
Washington Heights Park	.2	Vincennes road and 104th street	Lawns and shrubbery; adjoining Washington Heights swimming pool.

DIRECTORY OF PLAYGROUNDS

NAME AND LOCATION	SIZE	FACILITIES	WINTER EQUIPMENT
ADAMS—Seminary avenue near Center street; one block from school	102x288	Single playfield, sand house and shelter platform.	Skating pond.
AGASSIZ—Seminary avenue and George street; public school yard	265x109	Single playfield.	Skating pond.
AUBURN PARK—Normal avenue and West 81st street; public school yard	210x210	Single playfield sand house and shelter platform.	Skating pond.
AUDUBON—Hoyne and Cornelia avenues; public school yard	138x264	Single playfield, sand house and shelter court.	Skating pond.
AVONDALE—North Sawyer and Wellington avenues; public school yard. School gymnasium part time	250x120	Separate athletic field, sand house and shelter platform.	Skating pond and social center.
BELDING—Tripp and Cullom avenues; public school yard	155x195	Single playfield, shelter platform and sand house.	Skating pond.
BEUTNER—33rd and LaSalle streets, adjoining public school	258x546	Separate athletic field, running track, sand house and shelter platform, baseball and football field.	Skating pond.
BOSLEY—31st and Bonfield streets, adjacent to school	116x696	Separate athletic field, sand house and shelter platform, baseball and football field, wading pool.	Skating pond and toboggan slide
BRENTANO—Fairfield avenue and Schubert street; public school yard. School gymnasium	139x358	Single playfield, sand house and shelter platform.	Skating pond. Use school gym. Social center.
BUDLONG—Foster near Lincoln avenue; public school yard. Use of gymnasium part time	325x200	Single playfield, sand house and shelter platform.	Skating pond and social center.
BURLEY—Barry avenue between Paulina street and Ashland avenue; public school yard	252x128	Single playfield, sand house and shelter platform.	Skating pond.
BURROUGHS—36th street and Washtenaw avenue; public school yard	265x159	Single playfield, sand house and shelter platform.	Skating pond.
CAMERON—Potomac and Monticello avenues; public school yard	272x208	Single playfield, sand house and shelter platform	Skating pond.
CARTER—East 58th street and Michigan avenue; public school yard. School gymnasium part time	150x256	Single playfield, sand house and shelter platform.	Skating pond and social center.
CHRISTOPHER—22nd and Robey streets, two blocks from school	125x275	Single playfield, sand house and shelter platform.	Skating pond.
COLMAN—Dearborn street North of 47th street; public school yard	320x125	Single playfield, sand house and shelter platform.	Skating pond.
COMMERCIAL CLUB—Chicago avenue and Lincoln street, three blocks from school	120x123 and 125x200	Two playfields, shelter platform and sand court.	Skating pond and toboggan slide.
COOPER—18th Place between Ashland avenue and Paulina street; public school yard	125x209	Single playfield,	Skating pond.
COPERNICUS—60th and Throop streets; public school yard	268x96 and 96x96	Single playfield, sand house and shelter.	Skating pond.
CORKERY—25th street and Kildare avenue; public school yard. Use indoor gymnasium	265x164	Single playfield, sand house and shelter platform, wading pool and gardens.	Skating pond and indoor gymnasiums.
DANTE—Forquer and Desplaines street; public school yard	235x95	Single playfield, shelter platform and sand house.	Skating pond.
DAVIS—West 39th place and Sacramento avenue, adjoining public school	278x265	Separate athletic field, running track, sand house and shelter platform.	Skating pond and toboggan slides.
DELANO—West Adams street and Springfield avenue; public school yard	218x260	Separate athletic field, sand house and shelter platform; running track.	Skating pond.
DOOLITTLE—35th street between Cottage Grove and Rhodes avenue; public school yard	231x179	Single playfield, sand house and shelter platform.	Skating pond.
DRAKE—27th street and Calumet avenue; public school yard	181x194	Single playfield, sand house and shelter platform.	Skating pond.

EARLE—South Paulina and West 61st street; public school yard. Use of gymnasium part time	290x125	Single playfield, sand house and shelter platform.	Skating pond and social center.
EMMET—West Madison street and Pine avenue; public school yard	316x288	Single playfield, sand house and shelter platform.	Skating pond.
FIELD—North Shore and Greenview avenue; public school yard.	275x290	Separate athletic field, sand house and shelter platform; running track.	Skating pond.
FISKE—62nd street and Ingleside avenue; public school yard	264x174	Single playfield, sand house and shelter platform.	Skating pond.
FRANKLIN—Sigel street between Wells and Sedgwick; public school yard	200x125	Single playfield, sand house and shelter platform.	Skating pond.
FULTON—West 53rd and Paulina streets; public school yard	296x136	Single playfield, sand house and shelter platform.	Skating pond.
GALLISTEL—104th street and Ewing avenue; public school yard. Use of gymnasium part time	300x125	Single playfield, sand house and shelter platform.	Skating pond and social center.
GARY—Lawndale avenue and 31st street; public school yard	602x265	Single playfield, sand house and shelter platform.	Skating pond.
GLADSTONE—Robey street and Washburne avenue; public school yard	240x125	Single playfield, sand house and shelter platform.	Skating pond.
GRAHAM—45th street and Union avenue; public school yard	90x265	Single playfield	Skating pond.
HAMLIN—16th street and Hamlin avenue, adjacent to school	300x598	Separate athletic field, running track, baseball and football field.	Skating pond and toboggan slide.
HENRY—North St. Louis and West Cullum avenues; public school yard	300x125	Single playfield, sand house and shelter platform.	Skating pond.
HOWE—Long avenue and Superior street; public school yard	344x125	Single playfield, sand house and shelter platform.	
KOHN—East 104th and State streets; public school yard. Use school gymnasium	310x266	Separate athletic field, running track, tennis court, and house and shelter platform.	Skating pond, indoor gymnasium and toboggan slide.
LAWSON—13th St. & Homan avenue; public school yard	250x150	Single playfield, temporary portable office.	Skating pond.
LEMOYNE—Rokeby and Addison streets; public school yard	290x290	Separate athletic field, sand house and shelter.	Skating.
LLOYD—Dickens and Lamon avenues; public school yard	275x267	Separate athletic field, sand house and shelter platform; running track.	Skating pond and toboggan slide.
McCORMICK—28th street and Sawyer avenue, adjoining public school	125x275	Single playfield, sand house and shelter platform.	Skating pond and indoor gymnasium.
McCOSH—Champlain avenue between East 65th and 66th streets; public school yard	210x125	Single playfield, sand house and shelter platform.	Skating pond.
McLAREN—Polk and Laflin streets, two blocks from public school	185x175	Separate athletic field, sand house and shelter platform.	Skating pond and indoor gymnasium.
McPHERSON—North Winchester and Lawrence avenues; public school yard	280x152	Single playfield, sand house and shelter platform.	Toboggan slide.
MITCHELL—Oakley boulevard and Ohio street; public school yard	140x110	Single playfield.	Skating.
MORSE—North Sawyer and West Ohio streets; public school yard. Use of school gymnasium	280x130	Single playfield, sand house and shelter platform.	Skating pond and indoor gymnasium.
MOSELEY—24th street and Wabash avenue, adjoining public school	200x200	Separate athletic field, running track, tennis court, sand house and shelter court.	Skating pond.
MOZART—West Hamlin and Humboldt avenue; public school yard. Use of school gymnasium	266x125	Single playfield, sand house and shelter platform.	Skating pond and indoor gymnasium.
NETTLEHORST—Broadway and Aldine avenues; public school yard	344x100	Single playfield, sand house and shelter platform.	Skating pond.
NORTHWESTERN—Larrabee and Alaska streets, three blocks from school. Under elevated railroad	70x350	Single playfield, sand house and shelter platform.	Closed.
OAKLAND—Langley avenue and 40th street; public school yard.	150x198	Single playfield and portable building.	Skating.

DIRECTORY OF PLAYGROUNDS—Continued

NAME AND LOCATION	SIZE	FACILITIES	WINTER EQUIPMENT
ORLEANS—Orleans street and Institute place, two blocks from school. Under elevated railroad	126x136	Single playfield, sand house and shelter platform.	Skating pond.
OTIS—Armour street and Grand avenue; public school yard	200x160	Single playfield, sand house and shelter.	Skating.
PICKARD—South Oakley avenue and West 21st place; public school yard	275x130	Single playfield, sand house and shelter platform.	Skating pond.
POE—Langley avenue and East 106th street; public school yard.	200x125	Single playfield, sand house and shelter platform.	Skating pond.
RASTER—Wood and West 70th streets; public school yard	265x181	Single playfield, sand house and shelter platform.	Skating pond.
REZIN ORR—Keeler avenue and Thomas street; public school yard	250x267	Separate athletic field.	Toboggan, skating, social center and indoor gymnasium.
ROBEY—Robey and Birch streets, four blocks from school	175x114	Single playfield and office building.	Skating pond.
RYDER—Lowe avenue and West 88th street; public school yard. Use school gymnasium part time	250x196 and 96x96	Single playfield, sand house and shelter platform.	Skating pond and social center.
RYERSON—Lawndale avenue and Ohio street; public school yard	290x125	Single playfield, sand house and shelter platform.	Skating.
SAMPSON—15th and Loomis streets, one block from school	125x215	Single playfield, sand house and shelter platform.	Skating pond.
SCANLON—Perry avenue between 117th and 118th streets; public school yard. Use of school gymnasium part time	295x154	Single playfield, sand house and shelter platform.	Use of school swimming pool two months. Skating pond and social center.
SHERWOOD—57th street and Princeton avenue, adjacent to public school	156x250	Separate athletic field, baseball and football, sand box.	Skating pond.
SWIFT—Winthrop avenue between Ardmore and Thorndale avenue; public school yard	340x125	Single playfield, sand house and shelter platform.	Skating pond.
SWING—Jefferson street between 17th and 18th streets; public school yard	220x130	Single playfield, sand house and shelter	Skating pond.
THORP—89th street and Buffalo avenue; public school yard. School gymnasium part time	140x140	Single playfield, house and shelter platform.	Skating pond and social center.
WASHINGTON—Grand avenue and Carpenter street; public school yard	128x174	Single playfield, sand house and shelter platform.	Toboggan and skating pond.
WATERS—West Wilson and North Campbell avenues; public school yard. Use of school gymnasium part time	250x250	Separate athletic field, sand house and shelter platform.	Toboggan slide, skating pond and social center.
WHITTIER—23rd street and Lincoln street; public school yard	124x300	Single playfield.	Skating.
WRIGHTWOOD—Wrightwood and Greenview avenues; one block from school	361x454	Separate athletic field, running track, sand house, shelter platform, wading pool, baseball and football field.	Skating pond, toboggan and indoor gymnasium.

DIRECTORY OF BATHING BEACHES AND NATATORIUMS

Name and Location	Area	Equipment
Clarendon Beach— Lake Michigan, foot of Sunnyside..	774 ft. water front	Bath house with dressing rooms for men, women and children. Capacity 9,390 lockers.
Rogers Park Beach— Lake Michigan, foot of Kenilworth Avenue........................	250 ft. water front	Bath house with dressing rooms for men, women and children. 1,000 baskets.
51st Street Beach— Lake Michigan, foot of 51st Street..	300 ft. water front	Bath house with dressing rooms for men, women and children. 1,920 lockers.
New South Shore Beach— Lake Michigan, 75th to 79th Street	⅝ mile water front	Temporary bath house with dressing rooms for men, women and children. Basket check system. 5,000 baskets.
Rocky Ledge Beach— Lake Michigan, foot of 79th Street..	890 ft. water front	Bath house with dressing rooms for children.
Washington Heights—Swimming Pool 104th Street and Vincennes Avenue.	Outdoor pool 47x90	Bath house with dressing rooms for men, women and children. 150 lockers.
Griffith Natatorium— 104th Street and Harvard Avenue..	Indoor pool 30x60	Bath house with dressing rooms for men, women and children. 200 lockers.
Jackson Natatorium— 3506 West Fillmore Street.........	Indoor pool 30x60	Bath house with dressing rooms for men, women and children. 200 lockers.
Beilfuss Natatorium— 1725 North Springfield Avenue.....	Indoor pool 30x60	Bath house with dressing rooms for men, women and children. 200 lockers.

Annual Attendance at Beaches and Natatoriums

For the Year 1919

BEACHES

	Paid Attendance	Boys and Girls (No charge)	Bathers using beach but not lockers (No charge) estimated	Total
Clarendon Beach	201,229	38,220	135,148	374,597
Rogers Park Beach	1,572	4,884	3,759	10,215
51st Street Beach	50,867	9,156	34,910	94,933
Rainbow Beach (76th street)	76,398	....	51,930	128,328
Rocky Ledge Beach (children)	....	67,908	16,396	85,304
Total Beaches	330,066	120,168	242,143	692,377

NATATORIUMS

	Boys	Girls	Men	Women	Total
Griffith Natatorium	56,483	16,751	36,751	18,783	128,768
Washington Heights Pool	11,440	7,984	3,227	1,839	24,490
Jackson Natatorium	52,976	22,925	26,924	14,872	117,697
Beilfuss Natatorium	81,852	30,126	29,979	16,782	158,739
Total	202,751	77,786	96,881	52,276	429,694

NORTH SIDE STREET ENDS

	June	July	August	September	Total
Birchwood	4,507	11,169	10,610	780	27,066
Jarvis	4,408	7,640	5,450	485	17,983
Greenleaf	4,101	9,843	10,055	825	24,824
Morse	9,430	23,995	16,275	1,425	51,125
Farwell	8,620	26,846	15,025	1,100	51,591
North Shore	3,555	8,385	5,005	345	17,290
Albion	4,216	4,410	4,795	400	13,821
Rosemont	5,029	25,945	16,640	1,200	48,814
Thorndale	1,932	9,870	6,480	930	19,212
Ardmore	3,675	7,214	5,635	370	16,894
Hollywood	3,674	12,905	9,390	800	26,769
Foster	3,103	9,730	5,655	500	18,988
Winona	5,825	20,931	16,875	1,565	45,196
Glengyle	9,685	46,775	16,800	1,500	74,760
Lakeside	5,148	12,030	11,125	1,025	9,828
Gordon Terrace	6,346	18,870	12,485	1,030	38,731
Total	83,264	256,558	168,305	14,280	501,797

SOUTH SIDE STREET ENDS

	June	July	August	September	Total
54th Street	5,042	12,148	11,320	920	29,430
55th Street	162	5,425	4,293	86	9,966
72nd Street	3,250	6,749	5,260	142	15,401
73rd Street	2,316	4,560	4,243	152	11,271
74th Street	3,829	13,420	6,937	460	24,646
77th Street	2,460	7,892	5,434	240	16,026
78th Street	1,968	5,695	4,829	120	12,612
Total	19,027	55,889	42,316	2,120	119,352

Total Street Ends	621,149
Total Bathing Beaches	692,377
Total Natatoriums	429,694
Grand Total	1,743,220

BUREAU OF SEWERS

HON. CHARLES R. FRANCIS,
Commissioner of Public Works.

Dear Sir:

I submit herewith the anual report of the Bureau of Sewers for the year 1919:

237a

Salari
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*Inte
†Cost

Built, 1918	9,862 ft.	169,299 ft.	3,528	1,335	599,476.88	
Built, 1919	8,378 ft.	120,254 ft.	1,899	912	836,803.03	
In place January 1, 1919	3,979,686 ft.	9,358,251 ft.	124,884	94,496	$40,605,331.14	396

Repairs and Construction by the Bureau of Sewers in 1919

EXPENDITURES

Repairs:

Salaries and wages	$53,932.43	
Teams and carts	15,286.00	
Material and miscellaneous	19,938.13	
Restoration of streets	11,093.98	
For repairs		$100,250.54

Construction and betterments:

Salaries and wages	$ 5,131.37	
Teams and carts	1,579.50	
Material and miscellaneous	592.98	
For construction		7,303.85
Total, repairs and construction		$107,554.39

WORK DONE

1962 lineal feet of sewers built.
5610 lineal feet of sewers rebuilt.
23 manholes built.
820 manholes repaired.
30 catch basins built.
1963 catch basins repaired.
19 bench monuments built.
11 sub-standard bench monuments built.
2978 manhole and catch basin lids replaced.
629 manhole and catch basin covers replaced.
612 inlet grates replaced.
192 inlet grates and boxes replaced.

HOUSE DRAIN DIVISION

Number of jobs inspected:

House drains extended from junctions	fee permits	2,652
House drains extended from stubs	fee permits	2,127
House drains built or repaired	no fees	1,645
House drain stubs built by Council Order	no fees	1,000
Total number of jobs		7,424

A total number of 45,274 inspections were made on this work.

Extra junctions set:

8-inch junctions	131
6-inch junctions	232
Total set	363

House Drain Stubs laid by the Board of Local Improvements:

By special assessment	351
By private contract	3,813
	4,164

RECEIPTS

For house drain permits	$ 23,896.90
For extra junctions	1,235.00
For drainlayers' licenses	1,840.00
Special deposits for inspections, etc	7,660.00
	$ 34,632.23

Engineering and Bench and Grade Division

This division maintains a system of bench marks and bench monuments throughout the City, which give references to Chicago City Datum. It examines and submits to the City Council all street grades and keeps public records of such street grades after their establishment by Council Ordinances. It examines all street grades contained in improvement ordinances. It provides engineering for sewerage built other than by special assessment.

During the period of 1919 the building of standard and sub-standard bench monuments was continued, and the elevations of these monuments and of a number of bench marks were determined. The quantities were as follows:

Miles of bench levels run	51
Standard bench monuments built	19
Standard bench monuments established	12
Sub-standard bench monuments built	11
Sub-standard bench monuments established	2
Miscellaneous bench marks established	50

Construction of the sewerage being built in connection with the Chicago Union Station was continued, the principal items being a reinforced concrete sewer in West Polk Street, sewers in South Canal Street from West Taylor Street north and sewers for track drainage between West Harrison Street and West Taylor Street.

Respectfully submitted.
GEO. E. McGRATH,
Superintendent of Sewers.

BUREAU of MAPS and PLATS

HON. CHAS. R. FRANCIS,
Commissioner of Public Works.

Dear Sir:

I submit herewith annual report for year ending December 31, 1919:

The area of the city remains the same as of December 31, 1918, viz: 199.372 square miles.

Outside of routine work herein tabulated, work of special importance was done for the Board of Local Improvements in the preparation of plats for the widening of Western Avenue, Ashland Avenue, Robey Street, West Randolph Street, West South Water Street, Peterson Avenue, and for the extension of Ogden Avenue.

The Survey Division during the year expended the sum of $22,177.85 for survey work, of which amount 98 per cent was spent on railroad reclamation work under direction of the Committee on Local Industries.

The survey of the Chicago and Northwestern Railroad is completed and the mapping of the same will be finished in a few weeks.

The survey of the Chicago, Burlington and Quincy Railroad was taken up and is 20 per cent completed.

The matters in controversy with the Chicago and Western Indiana Railroad are awaiting court action, an amended bill thereon having been filed in November, 1919.

The matters in controversy with the Illinois Central Railroad were settled in the so-called Lake Front ordinance passed in July, 1919, the city receiving construction benefits to the extent of $2,100,000 in lieu thereof.

The matters in controversy with the Atchison, Topeka and Santa Fe Railroad are still pending, no definite course of action being settled upon. Up to the present there have been surveyed by this division 115 miles of main line, leaving 130 miles to be surveyed. In conjunction with this work, all yards and side tracks were surveyed.

The work for other city departments was not as large in volume as during other years.

FINANCIAL STATEMENT.

Division of Surveys Capital Account 1919.

MR. G. D. TOMPKINS, Engineer in Charge.

Committee on Local Industries, C. &. N. W. R. R.	$17,899.16
Committee on Local Industries, C. B. & Q. R. R.	3,703.80
Bureau of Engineering	361.30
City Comptroller	107.65
City Architect	45.94
Total	$22,117.85

SANBORN DIVISION.

JOHN W. MEYER in Charge.

The Sanborn system of atlases was enlarged by new volume 22, covering all territory between West 39th Street, West 47th Street, South Western Avenue and South Crawford Avenue, and new volume B covering all built up territory between West North Avenue, Belmont Avenue, North Austin Avenue and Harlem Avenue. 8,400 posters showing new buildings and alterations were put on the atlases.

Information given to City Collector in protest cases of garage, junk shops and lumber yard licenses, eight times; to Building Department in determining frontage consent cases, 82; Bureau of Fire Prevention for building inspections, 920; Bureau of Fire Prevention in determining frontage consents for gasoline filling stations and tanks, 42; Local Improvement Assessors, 276; Local Improvement Engineers, 168; Local Improvements for study maps for street and alley openings, 16; Local Improvements for study maps for widening of Ogden Avenue, Western Avenue, Ashland Avenue, Robey Street, South Water Street and West Randolph Street; to Bureau of Compensation in cases of encroachment on public property, 235; for locating proper house numbers and other office activities, 775; to other departments of the city, 544; to public—general information, 1,788.

114 hours were spent on work in field, and plats were made as follows:

Bureau of Compensation	41
Building Department	7
Building Department (zoning study maps)	3
For Offices and Aldermen	7
Corporation Counsel	12
City Attorney	4
Fire Attorney	8
Real Estate Agent (Comptroller's office)	3
Bureau of Fire Prevention	2
Street Department	1
Total	88

Calls for information by the Government, State and County authorities, Drainage Board and Board of Education received prompt attention.

GENERAL OFFICE WORK.

JOHN WITTENBORN, Chief Draughtsman, in Charge.

NEW CONSTRUCTION WORK

City Map Department, Norwood Park....Page 4

PLATS MADE

No. of Plats		Miles
601	Assessment plats	359.000
322	Sidewalk plats	99.125
57	Sewer plats	188.875
96	Drain plats	60.125
559	Estimate plats	241.625
162	Water Pipe Extension plats	75.500
314	Plats for Board of Underground Work of Public Utilities of Chicago	190.000
1	Condemnation plat	0.250
37	Opening plats	976.125
115	Vacation and dedication plats	14.375
2,264		2,205.000

MISCELLANEOUS PLATS

	No. of plats
Plat for Mayor	1
Plat for Corporation Counsel	1
Plats for Aldermen	7
Plats for Bureau of Compensation	22
Plats for City Comptroller	2
Plats for City Clerk	3
Plat for City Attorney	1
Plat for Fire Attorney	1
Plats for Building Department	2
Total	40
Forward	2,264
Total number of plats	2,304

MAPS, CHARTS AND CERTIFICATES

	Days
In court, 1 man	2½
City maps, ward maps and annexation maps, 1 man	65
In Recorder's, County Clerk's and County Treasurer's offices, 1 man	35
Repairing atlases, 1 man	91
Coloring maps, 1 man	3
Signs and lettering, various departments, 1 man	19½
Posting atlases, 1 man	222½
Health Department, 1 man	65½
City Map Department, reconstructing pages in Norwood Park, 1 man	159½
Study Maps, 1 man	16½

PETITIONS AND ORDINANCES VERIFIED

	Number
For street car franchises, 1 man, 4 days	2
For saloon licenses, 1 man, 36 days	54
For house moving, 1 man, 37 days	79
For switch track, junk shop, hospital, garage, foundry, factory, sign board, ice plant, machine shop, laundry, baseball park, sausage casings, bakery, supply building, blacksmith shop, slaughtering and packing, woman's club, gasoline tank, lumber yard, frame building, livery stable and stucco building, 1 man, 140 days	178
Street and alley vacation and dedication ordinances	115
Total	428

PLATS APPROVED FOR RECORD BY SUPERINTENDENT OF MAPS

As (Ex Officio) Examiner of Subdivisions

	No. of plats
New subdivision plats	112
Vacation plats	50
Dedication plats	22
Opening and widening plats	4
Miscellaneous plats	28
Total	216

MISCELLANEOUS WORK

	Number
Legal descriptions at 25 cents each, $1,059.25	4,237
Fees for witness in court, $11.00	
Legal descriptions issued free, various departments	2,256
House number certificates for building permits	6,990
House numbers given without certificates	8,596
Public requiring special attention	22,079
Public having access to atlases	110,395
House numbers changed (special cases on complaint)	248
House numbers investigated and adjusted	1,145
Entries in atlases	300
Quit claim deeds	2
Correction deeds	2
Instruments from Recorder's office	9

AREA OF LAND SUBDIVIDED

	Acres
Resubdivision of land comprised	137.937
New subdivision of land comprised	578.576
Total	716.513

MILEAGE OF STREETS AND ALLEYS

Total miles of streets, December 31, 1918		3,237.944
Total miles of streets opened in 1919	14.016	
Total miles of streets vacated in 1919	1.056	
Increase	12.960	12.960
Total miles of streets December 31, 1919		3,250.904
Total miles of alleys, December 31, 1918		1,692.968
Total miles of alleys opened in 1919	15.000	
Total miles of alleys vacated in 1919	2.170	
Increase	12.830	12.830
Total miles of alleys December 31, 1919		1,705.798

STREET NAMES CHANGED BY ORDINANCE

Old name of Street	New name of Street	From	To
South Blvd	W. Lake St	Pine Ave	N. Austin Ave.
E. 12th St	E. Roosevelt Road	S. State St	Eastern Terminus
W. 12th St	W. Roosevelt Road	S. State St	S. Austin Ave.

AREA OF CITY

	Square miles
Area of city, December 31, 1919	199.372

Respectfully submitted,

JNO. D. RILEY,

Superintendent of Maps.

BUREAU of COMPENSATION

HON. CHAS. R. FRANCIS,
Commissioner of Public Works.

Dear Sir:

I submit herewith for your consideration the annual report of the Bureau of Compensation for the year ending December 31, 1919:

CLASSIFICATION OF NEW ACCOUNTS ESTABLISHED.

Switch tracks	30
Canopies	25
Scales	10
Use of streets, alleys and docks	14
Subsidewalk and alley space	10
Vacation of streets and alleys	41
Bridges over streets and alleys	9
Bulkheads, platforms, etc.	8
Miscellaneous	12
Water pipe tunnel privileges	1
Franchises providing for percentage of gross receipts	6
Total	166

All of the above accounts, with the exception of those providing for the vacation of streets and alleys, will require the payment of an annual compensation to the city. The annual revenue from these accounts will amount to approximately $21,614.05.

CLASSIFICATION OF PERMITS ISSUED.

Merchandise stands	1,970
Automatic weighing scales	769
Subsidewalk space	250
Switch track, canopy and other permits provided for by special ordinances	81
Miscellaneous	48
Total	3,118

STATEMENT OF PRIVILEGES AUTHORIZED

SWITCH TRACKS

Name	Location	Annual Compensation	Expiration
Whitehead, Grace Laflin	In Carroll avenue between N. Wells and N. LaSalle streets	$ 130.00	Nov. 22 '38
Wolf, Anna A.	Along and across Kingsbury street and across Rees street	112.50	Dec. 1 '37
Wilce Co., The T.	Across W. 22nd street and alley north between Throop and Allport streets	155.00	Feb. 2 '39
Calumet Company	Elevated in Stewart avenue north of Alexander street and in Alexander street west of Princeton avenue	710.00	Dec. 22 '38
Peter Hand Brewery Company	In and along Kingsbury street northwesterly of W. North avenue	150.00	Jan. 14 '37
Jefferson Ice Company	Across the north-south alley between N. Robey street, Fullerton avenue, N. Seeley avenue and the C. & N. W. R. R.	50.00	March 2 '39
Druecker, N. J.	Across N. Artesian avenue south of Schubert avenue	100.00	April 1 '39
Herrmann Warehouse Company	In and along N. Branch street, across inter section of Bliss street, Cherry avenue and N. Branch street and along Cherry avenue	370.00	Oct. 25 '28
National Lead Company	Along and across Mendell street, northwesterly of McLean avenue	100.00	June 15 '30
Hunt Jarvis	In and along East North Water street and East Austin avenue, easterly of North Michigan avenue	572.00	June 22 '39
Producers Material Company	Across Eastman street, southwesterly of Kingsbury street	100.00	July 1 '34
Wimp Packing Company	Across West 48th street west of Aberdeen street	100.00	July 13 '39
Van Schaack Bros. Chemical Works	In Avondale avenue near St. Louis avenue	100.00	July 20 '39
Gulbransen-Dickinson Co.	Along and across North Sawyer avenue north of West Chicago avenue	690.00	July 13 '39
Hydrox Company	Along and across Lake Park avenue southeasterly of East 24th street	480.00	June 22 '39
Du Pont, Henry F.	Along and across South Union avenue south of West 22d street	100.00	July 20 '39
Star Oil Company	Across North Irving avenue north of Fulton street	100.00	Nov. 11 '37
American Asphalt Paving Company, The	In South Paulina street south of Blue Island avenue	100.00	July 12 '38
Alwart, Frederick W.	Over and across Webster avenue west of Lister avenue	100.00	July 20 '39
Peacock, Robert E., Walter C. and Frank W.	Across first east-west alley south of West 35th street and west of Princeton avenue.	50.00	April 6 '36
Chicago, Milwaukee and St. Paul Railway Co.	(Six) in Hickory, West Division and Haines streets	640.00	June 21 '38
Chicago, Milwaukee and St. Paul Railway Co.	Across Kingsbury street, south of West Erie street	100.00	March 29 '38
Chicago, Milwaukee and St. Paul Railway Co.	In and along Hooker street between Rees and North Halsted streets	2,108.00	April 30 '39
Keelin & Co., T. W.	In and along Carroll avenue and across North Carpenter street	275.00	Dec. 16 '37
Consumers Company	(Two) along and across Hooker and Bliss streets	200.00	April 30 '39
Kirk & Company, James S.	(Two) in and along Austin avenue and East North Water street, easterly of North Michigan avenue	705.00	June 2 '37
Illinois Central Railroad Co.	Across West 120th street west of South Green street	100.00	March 17 '39
Griswold, Roy C. and Wellington Walker	(Elevated) over and across South Sangamon street north of West 16th street	100.00	July 13 '39
Boynton, et al, Stuart D.	Along and across Dominick street, across Center steet and adjacent alleys	135.00	June 17 '31
Lewis Manufacturing Company, F. J.	In South Robey street south of Blue Island avenue	375.00	Dec. 17 '35
Total		$ 9,107.50	

CANOPIES

Name	Location	Annual Compensation	Expiration
Hammond, Oliver C.	3143-7 South State street	$ 27.00	Jan. 1 '29
Bloom, Edward I.	6851 Stony Island avenue	25.00	Aug. 31 '28
Chicago Lincoln Club	108 Germania place	25.00	Nov. 8 '28
Kleinfelder, Charles	Wooden structure or shelter rear of 6556-58 Sheridan Road	25.00	Jan. 19 '29
Revelry Theatre Company	342 East 47th street	25.00	Nov. 22 '28
State Street Theatre Company	336 South State street	39.00	July 14 '29
Tonnesen, Beatrice	Covered balcony adjoining 2635 Hampden court	25.00	June 8 '29
Gayety Hippodrome Co.	9205 Commercial avenue	25.00	Sept. 4 '29
Hyman, Harry and Max Hyman	617 West North avenue	25.00	March 21 '29
Peerless Light Company, The	In Meridian street rear of 663-71 W. Washington Blvd	50.50	Sept. 25 '29
C. & R. Amusement Company	9206 Commercial avenue	25.00	August 28 '29
Kedzie Amusement Company	3202-8 West Madison street	39.00	April 25 '29
Lakeside Fish and Oyster Company	651-7 Fulton street	57.50	Oct. 26 '29
Hunt, Jarvis	(2) in East Austin avenue and St. Clair street adjoining 136-64 East Austin avenue	242.00	Oct. 7 '29
Chicago Lodge No. 4, B. P. O. E.	174 West Washington street	25.00	Dec. 16 '29
Chicago and Northwestern Railway Co.	(2) in North Clinton and North Canal streets, adjoining entrances to the Northwestern Terminal Station	155.00	Dec. 19 '29
Bauer & Black	2500 South Dearborn street	25.00	April 30 '29
Brenner, Mrs. Lottie G.	2844 West Madison street	30.50	June 13 '29
Baldwin Company, The	323 South Wabash avenue	30.00	July 5 '29
Whitestone Company	140-78 East Walton place	61.50	Nov. 27 '29
Hotel La Salle Company	(3) in North La Salle and West Madison streets adjoining northwest corner North La Salle and West Madison streets	90.00	June 20 '29
Larsen, Francis A.	1519 West Madison street	25.00	May 23 '29
Hoy On Satyep Co.	(2) 200-2 West 22d street	50.00	May 21 '29
Crutchfield, Woolfolk & Clore	14-16 West South Water street	32.50	April 23 '29
Cusack Company, Thomas	Rear of 1322-32 West Harrison street	67.00	Oct. 28 '28
Total		$ 1,246.50	

SCALES

Name	Location	Annual Compensation	Expiration
Monarch Refrigerating Company of Chicago	Northeast corner Cass street and East Austin avenue	$ 25.00	June 30 '27
Donnelly & Sons Co., R. R.	In East 21st street, east of Calumet avenue	25.00	April 7 '29
Gumbinsky Bros. Co.	2261 South Union avenue	25.00	August 18 '29
Kirk & Company, James S.	141 East North avenue	25.00	June 30 '29
American Hide and Leather Company	Northeast corner North Sangamon and Dix streets	25.00	Jan. 12 '29
Chicago & Northwestern Railway Co.	In West 15th place east of South Racine avenue	25.00	Jan. 10 '29
Horner & Co., Henry	127 North Jefferson street	25.00	Dec. 16 '29
Consumers Company	1504 Indiana avenue	25.00	July 20 '29
Consumers Company	636 West 65th street	25.00	July 20 '29
Consumers Company	355 North Carpenter street	25.00	July 20 '29
Total		$ 250.00	

USE OF STREETS, ALLEYS AND DOCKS

Name	Location	Annual Compensation	Expiration
Jung Brewing Company	Space in West Grand avenue between North Jefferson street and north branch of Chicago river	$ 403.50	Nov. 10 '21
Columbia Western Mills	Space in South Sangamon street north of West 122d street and maintenance of switch track at same location	161.05	Nov. 24 '20
Omaha Packing Company	Space in Lumber street west of Halsted street and adjacent alleys	1,416.69	Dec. 31 '21
Fitzpatrick Brothers	Space in Benson street northwesterly of West 32d street	50.00	Nov. 21 '22
Johnston & Jennings Company	Space in Besley court between Wabansia avenue and Chicago, Milwaukee and St. Paul R. R.	172.00	Oct. 31 '21
Adams Building Material Co.	Space in alley between Normal avenue, West 42d place, P. Ft. Wayne & C. R. R. and West 43d street	116.25	June 6 '21
Piano & Organ Supply Co., The	Space in Kingsbury street south of Southport avenue	388.50	April 30 '22
Goss Printing Press Co., The	Space in South Ashland avenue near West 15th place	201.60	June 22 '22
Sterling Lumber & Supply Co.	Space in alleys between 104th, Throop, 105th streets and C. R. I & P. R. R.	440.00	Oct. 14 '20
Central Commercial Co.	Space in Cherry avenue north of West Division street	74.40	April 30 '22
Whitman & Barnes Manufacturing Company, The	Portion of north-south alley between West 115th, South Halsted, West 116th and South Peoria streets	25.00	April 30 '22
Fairbank Company, N. K.	Space in Blackwell street between 19th and 20th streets	1,169.30	March 31 '22
Kewanee Boiler Company	Space in West 16th street adjoining intersection of Arthur street	445.00	Nov. 20 '22
Haines Distributing Company, The E. H.	Space in north-south alley between West 31st, West 32d, Federal streets and M. S. & R. I. R. R.	42.50	Nov. 20 '22
Total		$ 5,105.79	

SUB-SIDEWALK AND ALLEY SPACE

Name	Location	Annual Compensation	Expiration
Madison Building Company	Vault under first north-south alley west of State street, rear of premises at southwest corner State and Madison streets	$ 140.80	Nov. 20 '24
Bauer & Black	Tunnel under Federal street, south of West 25th street and vault under alley connecting premises at southwest corner Dearborn and West 25th streets and southeast corner Federal and West 25th streets	150.00	March 3 '28
Sinclair Refining Company	Gasoline tank in alley rear 432 Sherman street	10.00	March 3 '29
De Jonghe Hotel & Restaurant Company	Vaults under alleys in block between East Madison, East Monroe, South State streets and South Wabash avenue	200.00	May 31 '26
Illinois Vinegar Manufacturing Company, The	Tunnel under West 48th street east of South Oakley avenue	100.00	June 26 '29
Illinois Vinegar Manufacturing Company, The	Tunnel under West 19th street east of South Washtenaw avenue	100.00	Oct. 24 '28
Congress Hotel Company	Vaults under alleys in block between East Congress, East Harrison streets, South Michigan and South Wabash avenues	956.20	Dec. 31 '25
Lewin, Frank C.	Vault under alley rear of northwest corner North State and West Goethe streets	50.00	July 28 '29
Kirk & Company, James S.	Tunnel under and across East North Water street, east of North Michigan avenue	100.00	March 22 '28
Lewis Institute	Tunnel under alleys in block between West Madison, South Robey, West Monroe and South Winchester avenue adjoining Lewis Institute	1.00	Oct. 20 '28
Total		$ 1,808.00	

VACATIONS OF STREETS AND ALLEYS

Name	Location	Final Payment
Calumet Company	Alleys beween West 22d place, Alexander street, Princeton avenue, Archer and Stewart avenues	$ 50.00
White, John E.	North-south alley in block between West 58th street, West 59th street, South Kildare and South Kolin avenues	50.00
Wolbach, Murray	East-west alley between East Ohio street, East Grand avenue, North Michigan avenue and Rush street	8,112.00
Rehm, Clara J.	Alleys in blocks between West 25th street, West 26th street, South Washtenaw and South California avenues	3,830.22
Indian Refining Company	South Artesian avenue between A. T. & Santa Fe R. R. and Canal Levee; West 32d street between A. T. & Santa Fe R.R. and South Western avenue and alleys between West 32d street, Canal Levee, South Artesian and South Campbell avenues	5,650.81
Ketcham & Company, J. W	North-south alley between Monterey avenue, Wesley street, Homewood and Hale avenues	536.00
Chicago Packing Company	East-west alley between Gross avenue, West 46th street and Loomis street	905.25
Ehman Tire and Rubber Company	Alley in block between West 26th place, West 27th street, South La Salle street and Wentworth avenue	50.00
Consumers Company	East-west alley between Wrightwood avenue, Altgeld street, C. M. & St. P. R. R. and Ward street	1,557.00
Baker, Franklin B.	Northerly-southerly alley beween Hillock avenue, Archer avenue, Throop and Farrell streets	119.04
Lotko, Joseph	Alley between Archer avenue, West 43d street, South Sacramento avenue and South Whipple street	73.60
Pettibone-Mulliken Company	North Kilpatrick and North Keating avenues between Lemoyne and Hirsch streets and Hirsch street between North Kilpatrick and North Cicero avenues	7,682.40
Chicago Short Line Railway	Alleys between East 97th, East 98th street, Avenue N and Chicago Short Line Railway	3,728.00
Hauptman, Florence B	Alleys between C. M. & St. P. R. R., West Grand avenue, North Kolmar avenue and North Kenton avenue	2,239.76
Lowell, Clara S.	Alley between Cuyler avenue, Irving Park Blvd., Milwaukee and La Porte avenues	1,258.83
Whitbeck, Ansell E. and Gustave A. Reuter	West 63d street, West 63d place, South Union avenue and South Halsted street	1,508.94
Atkins, Carl J., Christina Atkins, Louis Freund and Barbara Freund	North-south alley between West 48th street, West 49th street, Justine street and South Ashland avenue	649.20
Van Schaack, Louis L.	Bernard street between Avondale avenue and Henderson street	833.58
Ascher, Nathan	East-west alley between West 63rd street, West 64th street, South Ashland avenue and South Marshfield avenue	1,381.53
Alwart, Frederick W.	Binzo street between Lister avenue and the C. & N.W.R. R. and alley between Lister avenue, C. & N.W. R. R., Webster avenue and Binzo street	4,804.10
Western Dry Color Company	Wallace street between West 51st and West 52nd streets	566.80
Gulbransen-Dickinson Company	East-west alley between C. M. & St. P. R. R., West Chicago avenue, North Kedzie and North Sawyer avenues	2,952.00
Calumet and Chicago Canal and Dock Company	Alleys between Anthony avenue, East 91st street, Colfax avenue and Anthony avenue, East 92nd street, Manistee and Marquette avenues	50.00
Klima, Albert	East-west alley between West 59th street, West 59th place, Grand Trunk R. R. and South Lawndale avenue	130.00
Paschen, Frank and Henry Paschen and the Commonwealth Varnish Company	Alleys between Diversey avenue, Parker avenue, North Karlov avenue and the C. M. & St. P. R. R.	1,188.38
Quinlan, William F.	East-west alley between Bryn Mawr avenue, Catalpa avenue, C. M. & St. P. R. R. and north-south alley east of Broadway	975.00
Northwestern Terra Cotta Company	North Hermitage avenue between Diversey Parkway and Wrightwood avenue	29,035.55
Goss Printing Press Company, The	West 15th place between Paulina and Wood streets	4,752.00
Lund, Hans and Ottorine Lund	North-south alley between Bloomingdale, Wabansia, N. Fairfield and N. California avenues	603.20
Illinois Malleable Iron Company	East-west alley between Wellington avenue, Diversey Parkway, North Paulina street and Chicago and Northwestern R. R.	50.00
Noel Company, Theodore	East-and-west alley between Alice place, West North avenue, North Leavitt street and North Hoyne avenue	250.00

Vacations of Streets and Alleys—Continued

Name	Location	Final Payment
Spinks, William, Josephine Uhrig Houts, Robert S. Houts and Clyde Uhrig	Alleys between C. R. I. & P. R. R., Vincennes road, 80th and 81st streets	800.00
Klee, Nathan	North-south alley between Lincoln avenue, School street and North Paulina street	1,981.12
Pulaski Coal Company	East-west alley between West 26th street, West 27th street, South Sacramento avenue and South Whipple street	726.72
Stein, Benjamin F.	Ellis avenue between East 85th street and I. C. R. R. and alley between East 85th street, East 86th street, Ellis and Ingleside avenues	840.70
Lynch, Vincent T.	East-west alley between West North avenue, Lemoyne street, Keystone and North Karlov avenues.	1,066.53
Folk, Wilbur J.	Alleys between West 69th street, West 70th street, South Leavitt street and South Irving avenue	480.00
James, Edgar and Barbara	North-south alley between P. C. C. & St. L. R. R., West 59th, South Halsted and South Green streets	640.00
Gordon, James C.	Alleys between West 53rd street, West Garfield Boulevard, Federal street and L. S. & M. S. R. R.	3,044.80
De Vries, Maggie	West 47th place between South Halsted and Junction Railway and alleys between West 47th street, West 48th street, South Halsted street and the Junction Railway	1,074.78
Kohler, Murray O.	South Kolmar avenue between West 30th and West 31st streets	4,037.51
Total		$100,265.35

BRIDGES OVER STREETS AND ALLEYS

Name	Location	Annual Compensation	Expiration
Union Liberty Furniture Company	Across alleys connecting 2nd, 3rd and 4th floors of premises at 1257-9 North Paulina street and 1272-8 Milwaukee avenue	$ 135.60	June 2 '27
Northwestern Terra Cotta Company, The	(2) over Terra Cotta place and Wrightwood avenue	200.00	Feb. 18 '29
Manufacturers' Exhibition Building Company	Across alley connecting premises known as 1321 Michigan avenue and 1304-24 Indiana avenue	150.00	Nov. 8 '28
Wilson and Company	Elevated runway over and across South Ashland avenue north of West 41st street.	150.00	June 22 '29
Peoples Gas Light and Coke Company	Across alley connecting premises known as 513-15 24th place and 510-12 25th street	50.00	Feb. 28 '29
Vilas Company, A. H	Over alley connecting premises at 1101-09 West Lake street and 166-72 North Curtis street	50.00	March 28 '29
Heineman Company, Oscar	Across alley connecting premises at Southeast corner Armitage and Fairfield avenues and 1937-45 North Fairfield avenue	50.00	July 16 '28
Callahan and Company, A. P	(4) across alley adjoining premises at 2401-59 South LaSalle street	200.00	April 30 '28
Lutz, Louis	Across Shades place connecting premises at 638 West North avenue and 638 Shades place	50.00	March 28 '29
Total		$1,035.60	

BULKHEADS

Name	Location	Annual Compensation	Expiration
Calumet Company	Elevated loading platform, runways and elevated walks in Stewart avenue and Alexander street	$ 174.60	Dec. 22 '38
Metal Specialties Manufacturing Company	Rear of 3200-8 Carroll avenue	25.00	Jan. 19 '29
Parliament, Carrie A.	22-4 East Austin avenue	125.10	April 30 '23
Monarch Refrigerating Company of Chicago	40-66 East Austin avenue	630.00	April 30 '23
United Breweries Company	(3) Adjoining 2419-21 West 21st street	25.00	April 30 '23
Herrmann Warehouse Company	In Cherry avenue and in first east-west alley north of Bliss street	50.00	Dec. 31 '28
Peerless Light Company, The	In Meridian street, rear of 663-71 West Washington Boulevard	34.80	July 18 '29
Piggly Wiggly Central Company	110-16 East Austin avenue	129.60	July 30 '29
Total		$1,194.10	

MISCELLANEOUS

Name	Location	Annual Compensation	Expiration
Patten, James A.	Conduit under rear of 612-20 Sherman street	$ 51.25	Dec. 9 '28
Sanitary District of Chicago, The	Duct and conduit under East 39th street between South State street and first north-south public alley east of South State street	50.00	Jan. 24 '34
West Woodworking Company	Conduit under and across north-south alley between North Ada street, Carroll avenue, Fulton and Sheldon streets	25.00	Feb. 1 '28
Dunbar Manufacturing Company	Conduit, pipes and traveling crane across alley rear of 5133-9 West Lake street and electric wires across Leamington avenue south of West Lake street	150.00	Jan. 11 '28
Dietzgen Company, Eugene	Conduit under east-west alley connecting premises at 969-75 Montana street and northeast corner Sheffield and Fullerton avenues	25.00	Dec. 6 '28
Chase & Sanborn	Ventilation stack over alley at 72-6 East Lake street	25.00	July 29 '28
Illinois Vinegar Manufacturing Company, The	Pipes over and across West 48th street, east of South Oakley avenue	150.00	June 26 '29
Sullivan Machinery Company	Conduits (2) under the surface of North Talman avenue north of West Lake street	100.00	June 20 '29
South Halsted Street Iron Works	Sixteen (16) electric wires over and across north-south alley between South Halsted street, West 26th street, Emerald avenue and West 28th street	75.00	June 26 '29
Chicago and Northwestern Railway Company	Electric wires over and across West Kinzie street, east of South Karlov avenue	1.00	June 26 '29
Chicago Casket Company	Electric cables over and across Dekoven street, east of Clinton street	50.00	July 20 '29
Calumet Baking Powder Company	Pipes and fire escape over and drain under alley in block between Fillmore street, South Karlov avenue, South Keeler avenue and B. & O. C. T. R. R.	125.00	July 20 '29
Total		$ 827.25	

WATER PIPE TUNNEL PRIVILEGES

Name	Location	Annual Compensation	Expiration
Commonwealth Edison Company	Pipes (3) in West Division street water pipe tunnel	$ 39.31	O. C.
		$ 39.31	

ACCOUNTS ESTABLISHED

Providing for an Annual Compensation of a Certain Percentage of the Gross Receipts

Name	Location	Annual Compensation	Expiration
Englewood Distilled Water Ice Company	Conduit under and across West 60th street, west of Grove street.	3% gross receipts; minimum $50.00 per annum	March 27 '29
Hoefeld, Inc., Albert	Pipe under and acorss South Dearborn street, south of West Washington street	3% gross receipts; minimum $100.00 per annum	April 11 '29
Illinois Maintenance Company	Conduit (containing pipes) under north-south alley between Michigan and Wabash avenues and under roadway of Adams, Madison and Monroe streets	3% gross receipts; minimum $500.00 per annum	Dec. 7 '39
Illinois Maintenance Company	Tunnel (containing pipes) under Adams street between South Clark and South La Salle streets	3% gross receipts; minimum $100.00 per annum	Dec. 22 '38
Illinois Maintenance Company	Tunnel (containing pipes) under South Dearborn street between Monroe and Adams streets	3% gross receipts; minimum $100.00 per annum	Dec. 22 '38
Illinois Maintenance Company	Tunnel (containing pipes) under West Monroe street between South State and South Dearborn streets	3% gross receipts; minimum $100.00 per annum	Dec. 22 '38

RECAPITULATION

Comparison of Annual Revenue under New Accounts Established During the Years 1919 and 1918

	1919	1918	Increase	Decrease
Bay windows	$	$ 25.00		$ 25.00
Bridges over streets and alleys	1,149.95	1,368.32		218.37
Bulkheads, platforms, etc	1,319.20	1,531.35		212.15
Canopies	1,246.50	1,434.00		187.50
Scales	275.00	175.00	$ 100.00	
Subsidewalk and alley space	2,798.60	2,596.73	201.87	
Switch tracks	9,220.00	15,236.00		6,016.00
Use of streets, alleys, docks	4,002.58	7,389.51		3,386.93
Miscellaneous	1,002.25	709.25	293.00	
Vacation of streets and alleys	100,265.35	233,138.06		132,872.71
Stands	22,849.29	23,546.88		697.59
Openings	2,578.00	2,269.00	309.00	
Signs	306.50	306.20	.30	
Scales (automatic weighing)	3,816.60	3,953.76		137.16
Water pipe tunnel privileges	39.31		39.31	
Total	$ 150,869.13	$ 293,679.06	$ 943.48	$ 143,753.41 943.48
Total Decrease				$ 142,809.93

Comparison of Total Revenue under both Old and New Accounts During the Years 1919 and 1918

	1919	1918	Increase	Decrease
Bay windows	$ 170.50	$ 11,783.26		$ 11,612.76
Bridges over streets and alleys	43,184.08	41,970.85	$ 1,213.23	
Bulkheads, platforms, etc	7,516.21	5,980.75	1,535.46	
Canopies	12,635.89	12,817.00		181.11
Scales	3,206.15	3,126.00	80.15	
Subsidewalk and alley space	32,851.24	27,666.93	5,184.31	
Switch tracks	101,029.28	86,758.30	14,270.98	
Use of streets, alleys, docks	20,179.10	23,468.28		3,289.18
Miscellaneous	11,994.75	15,204.75		3,210.00
Vacations of streets and alleys	100,265.35	233,138.06		132,872.71
Stands	22,849.29	23,546.88		697.59
Openings	2,578.00	2,269.00	309.00	
Signs	306.50	306.20	.30	
Scales (automatic weighing)	3,816.60	3,953.76		137.16
Water pipe tunnel privileges	1,353.18	1,227.20	125.98	
Heat and power franchises	7,029.14	4,643.27	2,385.87	
Elevated railway mileage	1,767.30	1,767.30		
Telegraph franchises	23,881.78	2,991.58	20,890.20	
Total	$ 396,614.34	$ 502,619.37	$ 45,995.48	$ 152,000.51 45,995.48
Total Decrease				$ 106,005.03

The revenue derived from all sources for the year 1919 was $396,614.34, a decrease of $106,005.03 under the previous year. This entire amount is more than covered by the decrease in the revenue from the vacation of streets and alleys only, which decrease amounts to $132,872.71. In concluding the annual report for the year 1918, it was stated that the revenue of the bureau was dependent to some extent upon industrial conditions and that there was a strong probability the unsettled conditions due to the sudden ending of the war would be reflected in the revenue of the bureau for the year 1919. The labor trouble, which resulted in the suspension of building operations in Chicago for a long period during the last year, was another reason for this decrease. Many industries were compelled to abandon plans for expansion because of the disputes between the contractors and the Building Trades Unions. Other accounts show a healthy increase. Particular attention is called to the increase of $14,270.98 in the revenue from switch tracks, the total amount from this source for the year 1919 being $101,029.28, the first time that it has reached the $100,000 mark. It will also be noted that the revenue from telegraph franchises shows an increase of $20,890.20—this is the result of a new ordinance passed by the City Council during the last year, increasing the rates for use of public space by such companies.

The largest matter which was handled by the bureau during 1919 was the new Illinois Central terminal ordinance. Although there was apparently no revenue to the city from this source, it is estimated that in the settlement of the disputes with the Illinois Central over the rights of the city in Lake Street, South Water Street and River Street, east of Beaubien Court, the company was required to assume the expense of several millions of dollars for various improvements which otherwise would have been paid for by the city. The largest transaction outside of the one just referred to was the vacation of Hermitage Avenue between Wrightwood Avenue and Diversey Parkway for the Northwestern Terra Cotta Company, which required the payment of $29,035.55 to the city.

The following items, included in the list of accounts established, were the direct result of investigations made by this office; all the parties were illegally in occupation of public space and were required to apply to the City Council for authority to use the same.

VACATIONS.

Indian Refining Company	$5,650.81	
Frederick W. Alwart	4,804.10	
Florence B. Hauptman	2,239.76	
Consumers Company	1,557.00	
Maggie DeVries	1,074.78	
Hans and Ottorine Lund	603.20	
Theo. Noel Company	250.00	
		$14,997.35

SWITCH TRACKS.

Chicago, Milwaukee & St. Paul Ry. Co.	$2,108.00	
Consumers Company	200.00	
Jefferson Ice Company	50.00	
Robert E., Walter C. and Frank W. Peacock	50.00	
Per annum		$2,408.00

USE OF STREETS AND ALLEYS.

Sterling Lumber & Supply Co.	$440.00
Jung Brewing Company	403.50
Piano & Organ Supply Co.	388.50
Johnston & Jennings Company	172.00
Columbia Western Mills	161.05
Adams Building Material Company	116.25
Central Commercial Co.	74.40
Per annum	$1,755.70

In addition to the above, nine other concerns were required to secure authority for miscellaneous privileges, such as wires, bulkheads, etc., the total annual compensation from which will amount to $525.

With the co-operation of the Bureau of Electrical Inspection, Department of Gas and Electricity, an investigation is being made over the entire city for the purpose of securing new revenue from concerns which have installed electrical work over public space without authority. A large number of ordinances have been introduced into the City Council legalizing these privileges, but owing to the late convening of the Council in the fall of 1919, very few have been passed. Negotiations are now pending with two concerns for the maintenance of privileges of this character in public streets and alleys, which will result in ordinances authorizing the same during the year 1920, the revenue from which will approximate $10,000 per year.

This bureau also conducted negotiations with the Chicago Elevated Advertising Co. for the maintenance of advertising privileges on the portions of the elevated railway stations maintained over public space, which has resulted in an ordinance recommended by the Compensation Committee of the City Council providing for the payment of $10,000 per annum. It is expected that this ordinance will be passed by the City Council in the near future.

The test suit which was brought by the Lockwood & Strickland Company for refund of the money paid for the vacation of streets and alleys was decided adversely to the city by the Supreme Court. Although a number of similar suits have been started, the city has not yet been required to refund any of the money. A recent case which was handed down by the Supreme Court—People vs. Corn Products Refining Company—has brought into question the validity of ordinances vacating streets and alleys for private benefit. This decision has unquestionably resulted in a change of sentiment on the part of parties who were contemplating action for the return of the money, as, in every instance, the beneficiaries in vacation ordinances have used the streets and alleys vacated for the construction of valuable improvements and they now hesitate to start any action which may bring into question the validity of their vacation ordinances and assume the risk of the streets and alleys being reopened, which would require them to remove the improvements. At least twenty suits which were started against the city for the return of money have been dismissed. The situation from the standpoint of the city has improved materially during the past year.

There has been a decided increase in the number of applications and inquiries concerning privileges in public space and the vacation of public streets and alleys during the early part of 1920, and the prospects for a decided increase in the revenue of the bureau for the coming year are very good.

Respectfully submitted,
HENRY V. McGURREN,
Superintendent.

BUREAU OF ARCHITECTURE AND BUREAU OF CITY HALL

HON. CHAS. R. FRANCIS,
Commissioner of Public Works.

Dear Sir:

I submit herewith annual report for year ending December 31, 1919:

The activities of the bureau embraced the preparation of plans and specifications and the supervision of construction work embodied in sixteen projects, on which twenty-four contracts were awarded in the total amount of $79,999.32.

The work was divided among various departments and bureaus as follows:

Contracts	Department	Amount
3	Bureau of City Hall	$ 5,348.00
1	Bureau of Architecture	2,496.00
2	Bureau of Parks, Playgrounds and Beaches	12,918.50
2	Fire Department	2,048.00
8	Health Department	21,161.00
2	Police Department	1,232.48
6	Department of Gas and Electricity	34,800.39
24	Total value of work on which contracts were awarded in 1919	$79,999.32

And the work under the foregoing contracts was distributed among the various trades as shown below:

13	Contracts for general work	$64,216.07
1	Contract for plumbing work	1,558.00
2	Contracts for heating work	2,970.00
1	Contract for mechanical work	2,496.00
6	Contracts for equipment	8,134.25
1	Contract for elevator cables	630.00
24		$79,999.32

The following open orders were also issued for work to be constructed on the above projects:

5	Orders for general work	$ 4,455.52
4	Orders for plumbing work	2,550.48
4	Orders for heating work	2,250.94
1	Order for mechanical work	438.00
7	Orders for electrical work	10,234.84
21	Total value of work for which open orders were issued	$19,929.78

In addition to the above, plans and specifications were prepared and proposals received for the construction of a fire engine house, handball court, fences, etc., to be located at 744 West 35th Street, the cost of which is estimated at $70,000

Specifications were prepared and bids received for the furnishing of equipment for Ward Building No. 2 of the Municipal Contagious Disease Hospital, in the amount of..$63,772.72

Plans were prepared for the construction of a one-story pumproom addition, including transformer room; also for stone fence, with shelters at the Chicago Avenue Pumping Station. The estimated cost of this improvement being $150,000

Total value of work for which plans and specifications were completed during the year..$383,701.82

A detailed explanation of the preceding summary, with a short description of the work, follows:

DEPARTMENT OF HEALTH.

MUNICIPAL CONTAGIOUS DISEASE HOSPITAL.

Ward Building No. 2—

This structure, similar in design and construction to Ward Building No. 3, is now completed at the approximate cost of $575,000. Three passenger elevators were installed for the amount of $16,983. Specifications were prepared and bids received for furnishing and installing the equipment for this building, the bids totaling $63,772.72.

Ward Building No. 2—

Drawings and specifications were prepared, on which contract was awarded under date of August 14, 1919, for the installation of a glass-lined steel clothes chute, ventilator, doors, etc., in the amount of $5,392, construction of which is now completed.

Administration Building—

Laboratory equipment in the amount of $7,182.05 was installed in the laboratory rooms under a contract dated April 14, 1919, animal cages and racks in the amount of $590 under a contract dated May 29, 1919, and furniture in the amount of $732.20 under a contract dated April 14, 1919. This completes the furnishing of the laboratory.

Service Building—

The installation of two electric dumb waiters was completed August 1, 1919, for the sum of $2,186.

Improvements to Hospital Site—

Drawings and specifications were prepared and contract dated August 14, 1919, awarded for the construction of concrete walks, steps, retaining walls, curbs, etc. This contract was completed September 30, 1919, at the cost of $4,440. Contract was awarded under date of August 22, 1919, in the amount of $4,044 for the erection of an iron and board fence on the hospital grounds, the work on which is progressing satisfactorily and will be finished early in the coming year.

Public Comfort Stations—

A comfort station located at Madison and Market Streets containing toilet facilities for men and women was completed January 29, 1919, for the sum of $12,500. The station was maintained by the Department of Public Works until August 7, 1919, when same was taken over by the Health Department for operation.

Sketches were made for the proposed three underground comfort stations to be located at Clark and Division Streets, Ashland and Milwaukee Avenues, and 47th Street and Cottage Grove Avenue. The estimated cost of each station is placed at $15,000.

POLICE DEPARTMENT.

Plans and specifications were prepared, on which contract was awarded August 21, 1919, in the amount of $484 for the construction of concrete driveway, curbs, etc., at the new 24th District Police Station located at Chicago and Lorel Avenues.

DEPARTMENT OF GAS AND ELECTRICITY.

Southwest Electrical Substation—

10227-29 South Halsted Street—Plans and specifications were made and contracts awarded under date of May 20, 1919, for the construction of this substation in the amount of $30,000. The building consists of two stories, is of fireproof construction and will be used for the purpose of housing electrical apparatus in connection with the operation of the street lighting system in its vicinity.

Northwest Electrical Substation—

4531-33 North Keokuk Avenue—A contract dated August 7, 1919, in the amount of $795, was awarded for the construction of a one-story coal storage addition to this substation. Work was completed December 5, 1919. Additional driveways, walks, fences, etc., were installed during the year at the cost of $1,890.

South Chicago Electrical Substation—

8645-49 Yates Avenue—Plans and specifications were prepared on which a contract was awarded August 7, 1919, in the amount of $3,168 for the construction of a one-story coal storage brick addition. This building has been completed.

R. A. Waller Electrical Substation—

6261 South Wentworth Avenue—Plans and specifications were made and contract awarded under date of October 16, 1919, in the amount of $1,976 for the construction of a one-story storage platform in the interior of this building. The work was completed December 10, 1919.

Halsted Street Electrical Substation—

South Halsted Street and Blue Island Avenue—Drawings were prepared for the proposed platform addition inside of the present storage room, installation of new heating apparatus for entire building, construction of a one-story brick boiler room and exterior coal storage room, the cost of which is estimated at $12,000. This work will proceed early in the coming year, if appropriation is made for same.

FIRE DEPARTMENT.

The contract for completion of the fire department buildings located at 430-32 West 104th Street, 712-14 North Kedzie Avenue, and 1713 North Springfield Avenue, was completed July 15, 1919, for the sum of $10,589, and steel clothes lockers were installed under a contract dated June 23, 1919, in the amount of $850. Watchmen's services were maintained on the above mentioned buildings by the Department of Public Works until same were taken over for occupancy by the Fire Department.

Fire Engine and Truck House—

5441-45 Lake Park Avenue—This two-story and basement building of fireproof construction, designed for motor-driven apparatus, furnishes quarters for both engine and truck companies. An up-to-date handball court to provide for recreational activities of the men is included. The building was taken over by the Fire Department early in the year.

744 West 35th Street—

Plans and specifications were prepared and proposals received for the construction of a two-story and basement fire engine house, including handball court, fences, etc.; also the wrecking and removal of present buildings from site. As the balance in the Fire Department Building Bond Fund is not sufficient to meet the entire cost of this project, which is estimated at $70,000, we are awaiting favorable action by the City Council to supplement the balance in the Building Fund from other sources, so that contracts may be entered into and construction started.

HOUSE OF CORRECTION.

House of Shelter for Women—

Numerous sketches were completed of the proposed House of Shelter for Women and forwarded to the Board of Inspectors of the House of Correction for approval. A committee is now engaged in the selection of a site, and when this is acquired the final drawings and specifications will be prepared. The building, as contemplated, will consist of two stories and basement of brick construction and the cost is estimated at $50,000.

BUREAU OF PARKS, PLAYGROUNDS AND BATHING BEACHES.

Construction of a wading pool, typical sand court and shelter buildings at the Gary playground was completed June 30, 1919, for the sum of $3,250. Drawings and specifications were prepared and contract awarded under date of October 1, 1919, in the amount of $931.50 for the erection of iron and concrete fences at the John G. Whittier playground; this construction has now been completed.

Construction of typical office buildings, shelter and sand court buildings at the Thorpe, Budlong and Burroughs playgrounds was completed December 10, 1919, at the cost of $11,105.50.

An iron and concrete fence was constructed at the William Hale Thompson playground adjoining the Clarendon Avenue bathing beach. The work was completed in February for the sum of $4,892.

Specifications were prepared and contract awarded under date of October 16, 1919, for the painting of the buildings and equipment of 67 playgrounds for the sum of $11,987. The painting of 34 playgrounds is now finished, and it is expected to proceed with the balance at an early date.

BUREAU OF ENGINEERING.

Chicago Avenue Pumping Station Additions—

Architectural drawings were prepared for the construction on the present foundations of a one-story pumproom addition, including transformer room, also drawings for stone fence with shelter. The estimated cost of this improvement is placed at $150,000, and construction is progressing under the supervision of the Bureau of Engineering.

BUREAU OF ARCHITECTURE.

Chicago and Cook County School for Boys—

Specifications and drawings were prepared, on which contract was awarded under date of March 25, 1919, in the amount of $3,000 for the installation of refrigeration machinery and equipment in the basement of the dining hall at the above mentioned institution. The work was completed December 1, 1919, and terminates the construction activities in connection with the above project until additional appropriations are made available for future buildings.

BUREAU OF CITY HALL.

Specifications were prepared on which contract dated October 16, 1919, was awarded in the amount of $4,198 for the painting of the elevator shafts in the City Hall Building, and the balance of an appropriation of $15,000 for redecorating the building was expended for that purpose in various offices throughout the building. An additional appropriation to continue this work has been requested in the budget estimates for the year 1920. Contract was awarded in the amount of $630 for the installation of traction cables on No. 7 elevator of the building; also a contract was entered into under date of August 12, 1919, in the amount of $695 for the installation of three flat, suspended fire tile arches under the boiler furnaces. Both contracts have been completed.

The flower boxes which are placed on the first floor window sills during the summer months were maintained by this bureau.

The Bureau of Architecture, in addition to preparing plans and specifications and supervising the construction of municipal buildings, is charged with the maintenance and operation of the City Hall Building, which involves the management of the janitor, mechanical and electrical divisions and the supervision of all accounts and records of the Bureau of City Hall.

Respectfully submitted,

CHAS. W. KALLAL,
City Architect.

ACCOUNTING DIVISION

HON. CHAS. R. FRANCIS,
Commissioner of Public Works.

Dear Sir:—I have the honor to submit herewith the Annual Report of the Accounting Division of the Department of Public Works, for the fiscal year ending December 31, 1919.

The contents comprise the following series of financial statements, which are self-explanatory:

Table No. 1. Statement of Appropriations and Expenditures for the year 1919—Corporate Fund.

Table No. 2. Statement of Expenditures of Bureau of Streets for the year 1919.

Table No. 3. Detailed statement of Ward Expenditures of Bureau of Streets for the year 1919.

Table No. 4. Statement of Expenditures of Bureau of Sewers for the year 1919.

Table No. 5. Statement of Expenditures of Bureau of Parks, Public Playgrounds and Bathing Beaches for the year 1919.

Table No. 6. Statement of Expenditures of Bureau of Waste Disposal for the year 1919.

Table No. 7. Statement of Expenditures of Bureau of Engineering Corporate Fund for the year 1919.

Table No. 8. Statement of Corporate Fund Revenue of Department of Public Works for the year 1919.

Table No. 9. Statement of Appropriations and Expenditures for the year 1919, Water Fund.

Table No. 10. Statement of Revenue for the year 1919, Water Fund.

Table No. 11. Statement of Free Water Service rendered by the Chicago Water Works during the year 1919.

Table No. 12. Comparative Statement of Ordinary Revenue and Ordinary Expense of Water System for the years 1902 to 1919, inclusive.

Table No. 13. Statement of Water Fund Collections during the year 1919.

Table No. 14. Statement of Expenditures for Operation of Water System, including interest, during the year 1919.

Table No. 15. Statement of Expenditures for Repairs and Renewals of Water Works Property and Equipment during the year 1919.

Table No. 16. Statement of Expenditures for Additions, Extensions and Betterments of Water Works Property and Equipment during the year 1919.

Table No. 17. Comparative Statement of Expenditures for Operation of Water System, including interest, for the years 1912 to 1919, inclusive.

Table No. 18. Comparative Statement of Expenditures for Repairs and Renewals of Water Works Property and Equipment for the years 1912 to 1919, inclusive.

Table No. 19. Comparative Statement of Expenditures for Additions, Extensions and Betterments of Water Works Property and Equipment for the years 1912 to 1919, inclusive.

Table No. 20. Detailed Statement of Expenditures for Operation, Repairs and Renewals and Additions, Extensions and Betterments of Sewage Pumping Stations for the year 1919.

Table No. 21. Detailed Statement of Expenditures for Operation of Water Pumping Stations during the year 1919.

Table No. 22. Detailed Statement of Expenditures for Repairs and Renewals of Water Pumping Stations during the year 1919.

Table No. 23. Detailed Statement of Expenditures for Additions, Extensions and Betterments of Water Pumping Stations during the year 1919.

Table No. 24. Comparative Statement of Expenditures for Operation of Water Pumping Stations during the years 1910 to 1919, inclusive.

Table No. 25. Comparative Statement of Expenditures for Repairs and Renewals of Water Pumping Stations during the years 1910 to 1919, inclusive.

Table No. 26. Comparative Statement of Total Expenditures for Operation and Repairs and Renewals of Water Pumping Stations during the years 1910 to 1919, inclusive.

Table No. 27. Classified Summary of Appraisements of Chicago Water Works Property and Equipment, December 31, 1919.

Table No. 28. Appraisement of Chicago Water Works Property and Equipment, December 31, 1919.

Table No. 29. Trial Balance of Water Works General Ledger, December 31, 1919.

Table No. 30. Trial Balance of Water Works General Ledger, January 1, 1920.

Table No. 31. Statement of Estimated Cost of and Revenue from Supplying Water to Consumers during the year 1919.

Table No. 32. Bonds issued for benefit of Water Works Outstanding, January 1, 1920.

Very respectfully,
C. W. HIBBARD,
Head Accountant.

TABLE No. 1

Statement of Appropriations and Expenditures for Year 1919—Corporate Funds

		Appropriation	EXPENDITURES			Unexpended Balance
			Ordinary	Extraordinary	Total	
COMMISSIONER OF PUBLIC WORKS—OFFICE:						
71A	Salaries	$ 43,660.00	$ 43,247.01		$ 43,247.01	$ 412.99
71H	Printing, stationery and office supplies	4,500.00	4,195.05		4,195.05	304.95
71L	Impersonal services	504.00	453.40		453.40	50.60
71S	For services of engineers, accountants, investigators and such other employees as needed, and monthly audits	4,796.00	4,637.71		4,637.71	158.29
71E	Repairs to automobiles	300.00	114.99		114.99	185.01
71S	For all other expenses of operation and administration	700.00	585.01		585.01	114.99
	Totals	$ 54,460.00	$ 53,233.17		$ 53,233.17	$ 1,226.83
FOR EXPENSES OF COMMISSION TO INVESTIGATE UNDERGROUND SERVICE SYSTEMS:						
71A2	Salaries	$ 8,040.00	$ 7,863.53		$ 7,863.53	$ 176.47
71S2	For all other expenses of operation and administration	800.00	749.26		749.26	50.74
	Totals	$ 8,840.00	$ 8,612.79		$ 8,612.79	$ 227.21
For Expense of Operation of South Chicago Market:						
71A3	Salaries	$ 3,720.00	$ 3,706.85		$ 3,706.85	$ 13.15
71S3	For all other expenses of operation and administration	1,500.00	1,244.31		1,244.31	255.69
	Totals	$ 5,220.00	$ 4,951.16		$ 4,951.16	$ 268.84
71S4	For services of engineer in connection with Union Station development	$ 2,500.00	$ 2,500.00		$ 2,500.00	
	Totals	$ 2,500.00	$ 2,500.00		$ 2,500.00	
Bureau of Compensation:						
72A	Salaries	$ 9,535.00	$ 9,506.37		$ 9,506.37	$ 28.63
72S	For all other expenses of operation and administration	425.00	424.96		424.96	.04
	Totals	$ 9,960.00	$ 9,931.33		$ 9,931.33	$ 28.67
Bureau of Maps and Plats:						
73A	Salaries	$ 42,120.00	$ 42,106.03		$ 42,106.03	$ 13.97
73L	For installation and maintenance of Sanborn Atlases	650.00	555.25		555.25	94.75
73S	For all other expenses of operation and administration	1,280.00	1,114.42		1,114.42	165.58
73S1	For reimbursement of Division of Surveys, Capital account for work done for the Commission on Local Industries	6,504.19	6,504.19		6,504.19	
	Totals	$ 50,554.19	$ 50,279.89		$ 50,279.89	$ 274.30

TABLE No. 1—Continued

	Appropriation	EXPENDITURES			Unexpended Balance
		Ordinary	Extraordinary	Total	
BUREAU OF ARCHITECTURE:					
74A Salaries	$ 7,500.00	$ 7,474.37		$ 7,474.37	$ 25.63
74S For all other expenses of operation and administration	500.00	500.00		500.00	
Totals	$ 8,000.00	$ 7,974.37		$ 7,974.37	$ 25.63
BUREAU OF CITY HALL:					
75A Salaries and wages	$213,486.00	$211,436.17		$211,436.17	$ 2,049.83
75B Personal services	800.00	755.71		755.71	44.29
75C Material and supplies	22,000.00	21,993.97		21,993.97	6.03
75D Machinery and vehicles	950.00	875.81		875.81	74.19
75E Repairs by contract or open order	13,300.00	12,466.32		12,466.32	833.68
75F Fuel, light and power	51,900.00	40,045.31		40,045.31	11,854.69
75G Furniture and fixtures	3,500.00	2,813.63		2,813.63	686.37
75H Printing, stationery and office supplies	150.00	147.97		147.97	2.03
75L Telephone and other impersonal services	22,200.00	21,968.76		21,968.76	231.24
75S For all other expenses of operation and administration	15,000.00	14,875.37		14,875.37	124.63
Totals	$343,286.00	$327,379.02		$327,379.02	$ 15,906.98
BUREAU OF PARKS, PUBLIC PLAYGROUNDS and BATHING BEACHES:					
Administration:					
76A Salaries	$ 15,360.00	$ 14,610.70		$ 14,610.70	$ 749.30
Forestry:					
76A10 Salaries and wages	13,040.00	13,009.56		13,009.56	30.44
Bathing Beaches and Pools:					
76A21 Salaries and wages	75,422.50	71,858.47		71,858.47	3,564.03
Extra Life Guards for Unprotected Street Ends:					
76A22 Salaries and wages	9,040.00	8,294.43		8,294.43	745.57
76B Personal service	100.00	26.57		26.57	73.43
76C Material and supplies	12,600.00	12,034.47		12,034.47	565.53
76D Machinery and vehicles	1,700.00	1,651.13		1,651.13	48.87
76E Repairs by contract or open order	7,000.00	6,449.59		6,449.59	550.41
76F Fuel, light and power	3,200.00	3,186.08		3,186.08	13.92
76G Furniture and fixtures	900.00	878.30		878.30	21.70
76H Printing, stationery and office supplies	1,500.00	1,445.68		1,445.68	54.32
76J Passenger transportation	100.00	21.15		21.15	78.85
76K Hire of teams, horses and carts	200.00	32.00		32.00	168.00
76L Impersonal services	6,000.00	5,320.28		5,320.28	679.72

BUREAU OF PARKS, PLAYGROUNDS, AND BATHING BEACHES—Continued:						
Construction and Betterments:						
76X3	Lockers, 51st Street Beach	1,800.00		702.88	702.88	1,097.12
76X4	Diving stand, 51st Street Beach	600.00		485.03	485.03	114.97
76X5	Lighting system, 51st Street Beach	900.00				900.00
76X7	Diving stand, 76th Street Beach	1,000.00		208.44	208.44	791.56
76X8	Parking stands and seats, 76th Street **Beach**	1,000.00		344.40	344.40	655.60
76X10	Natatoriums, Tiling pool floors	5,000.00		4,602.16	4,602.16	397.84
	Totals	$156,462.50	$138,818.41	$ 6,342.91	$145,161.32	$ 11,301.18
DIVISION OF PLAYGROUNDS:						
76A30	Salaries and wages	$292,240.00	$276,260.70		$276,260.70	$ 15,979.30
76A31	Salaries and wages	78,965.00	78,803.26		78,803.26	161.74
76B30	Personal service	750.00	742.66		742.66	7.34
76C30	Material and supplies	46,700.00	44,013.26		44,013.26	2,686.74
76D30	Machinery and vehicles	3,100.00	2,945.09		2,945.09	154.91
76E30	Repairs by contract or open **order**	16,200.00	16,086.32		16,086.32	113.68
76F30	Fuel, light and power	5,450.00	5,298.47		5,298.47	151.53
76G30	Furniture and fixtures	1,500.00	1,473.26		1,473.26	26.74
76H30	Printing, stationery and office **supplies**	1,200.00	998.78		998.78	201.22
76J30	Passenger transportation	5,000.00	4,993.37		4,993.37	6.63
76K30	Hire of teams, horses and carts	1,300.00	1,268.50		1,268.50	31.50
76L30	Impersonal service	2,650.00	2,649.78		2,649.78	22
76X30	Construction and betterments **(to be expended upon passage of** ordinance)	37,500.00		31,558.68	31,558.68	5,941.32
76X31	Unpaid contract liabilities	20,722.30		19,028.13	19,028.13	1,694.17
	Total	$513,277.30	$435,533.45	$ 50,586.81	$486,120.26	$ 27,157.04
BATHING BEACH BOND FUNDS:						
476X30	Shore protection at 51st St. Beach and **East End Park**	$ 10,421.08		$ 10,421.08	10,421.08	
476X20	Playground apparatus and enlargement **of children's quarters 51st** Street Beach	648.61		406.00	406.00	242.61
476 X31	For construction of jetties for shore pro**tection between 75th and** 79th streets	24,578.92		24,509.53	24,509.53	69.39
476 X32	Claim of Butler & Co.	755.14		73.95	73.95	681.19
476 X33	Walks, parking and grading and general **improvements at 51st St.,** Clarendon and 76th Street Beaches	16,078.82		14,532.51	14,532.51	1,546.31
476 X34	For construction of jetties at Kenilworth **and Clarendon Beaches**	15,000.00		5,493.96	5,493.96	9,506.04
	Total	$ 67,482.57		$ 55,437.03	$ 55,437.03	$ 12,045.54
	Total, Bureau of Parks, Playgrounds and Bathing Beaches	$737,222.37	$574,351.86	$112,366.75	$686,718.61	$ 50,503.76

TABLE No. 1—Continued

	Appropriation	EXPENDITURES			Unexpended Balance
		Ordinary	Extraordinary	Total	
BUREAU OF WASTE DISPOSAL					
Administration:					
77 A Salaries	$ 8,680.00	$ 8,666.26	....	$ 8,666.26	$ 13.74
77 S For all other expenses of operation and administration	1,590.00	1,587.36	....	1,587.36	2.64
Totals	$ 10,270.00	$ 10,253.62	....	$ 10,253.62	$ 16.38
Municipal Reduction Plant:					
77 A1 Salaries and wages	$310,640.00	$310,344.77	....	$310,344.77	$ 295.23
77 C1 Material and supplies	67,400.00	67,315.82	....	67,315.82	84.18
77 E1 Repairs by contract or open order	36,300.00	36,299.85	....	36,299.85	.15
77 F1 Fuel, light and power	113,825.00	113,745.95	....	113,745.95	79.05
77 K1 Hire of teams, horses and carts	4,625.00	4,613.50	....	4,613.50	11.50
77 L1 Impersonal services	16,185.00	16,184.72	....	16,184.72	.28
Totals	$548,975.00	$548,504.61	....	$548,504.61	$ 470.39
Bridewell Incinerator:					
77 A4 Salaries and wages	$ 7,140.00	$ 7,140.00	....	$ 7,140.00	....
77 B4 Reimbursement to House of Correction for labor	1,975.00	1,975.00	....	1,975.00	....
77 F4 Fuel, light and power	7,850.00	7,723.68	....	7,723.68	126.32
77 S4 For all other expenses of operation and administration	910.00	873.31	....	873.31	36.69
Totals	$ 17,875.00	$ 17,711.99	....	$ 17,711.99	$ 163.01
Waste Disposal Building and Equipment Bond Funds:					
477 X30 For the completion and rehabilitation program as approved by the City Council, June 17, 1918	$141,178.33	....	$105,906.04	$105,906.04	$ 35,272.29
477 X93 For the completion of the Municipal Garbage Reduction Plant, 95th Street Incinerator	1,722.93	....	....	....	1,722.93
	$142,901.26	....	$105,906.04	$105,906.04	$ 36,995.22
Municipal Reduction Plant Bond Funds:					
477 X91 Condensers, Percolators, Evaporators, etc	$ 12,123.30	....	$ 2,960.00	$ 2,960.00	$ 9,163.30
	$ 12,123.30	....	$ 2,960.00	$ 2,960.00	$ 9,163.30
95th Street Incinerator Bond Funds:					
477 X92 New Boiler	$ 4,416.00	....	....	....	$ 4,416.00
Totals	$ 4,416.00	....	....	....	$ 4,416.00
Total Bureau of Waste Disposal	$736,560.56	$576,470.22	$108,866.04	$685,336.26	$ 51,224.30

BUREAU OF MUNICIPAL PIER:						
78 A1	Salaries—Administration	$ 8,280.00	$ 8,177.23		$ 8,177.23	$ 102.77
78 A2	Salaries and wages—Operation	27,513.00	27,164.46		27,164.46	348,54
78 A3	Salaries and wages—Maintenance and operation	29,545.00	29,472.56		29,472.56	72.44
78 B	Personal services	27.00	26.67		26.67	.33
78 C	Material and supplies	7,000.00	6,390.57		6,390.57	609.43
78 E	Repairs by contract or open order	9,300.00	9,285.58		9,285.58	14.42
78 F	Fuel, light and power	9,500.00	9,490.85		9,490.85	9.15
78 G	Furniture and fixtures	550.00	86.45		86.45	463.55
78 H	Printing, stationery and office supplies	200.00	120.78		120.78	79.22
78 J	Passenger transportation	150.00	144.99		144.99	5.01
78 L	Impersonal service	4,700.00	4,699.15		4,699.15	.85
78 S	For all other expenses of operation and administration	1,000.00	1,000.00		1,000.00	
	Total	$ 97,765.00	$ 96,059.29		$ 96,059.29	$ 1,705.71
Harbor Construction—Bond Funds:						
478 X2	For installation of freight elevators and balance due on contract liabilities	$ 12,621.00		$ 12,273.90	$ 12,273.90	$ 347.10
478 X3	For construction of sheet piling jetties for shore protection between 75th and 79th streets	67,248.02		56,582.60	56,582.60	10,665.42
478 X4	For shore protection at 51st St. Beach and East End Park	25,000.00		19,592.22	19,592.22	5,407.78
478 X5	For such other construction as may be ordered by the City Council	137,483.65		35,177.50	35,177.50	102,306.15
	Total	$242,352.67		$123,626.22	$123,626.22	$118,726.45
	Total, Bureau of Municipal Pier	$340,117.67	$ 96,059.29	$123,626.22	$219,685.51	$120,432.16
BUREAU OF STREETS:						
Superintendent's Office:						
81 A	Salaries	$ 58,340.00	$ 56,289.43		$ 56,289.43	$ 2,050.57
81 H	Printing, stationery and office supplies	7,400.00	7,175.57		7,175.59	224.43
81 J1	For maintenance of Supt's. personally owned automobiles	2,600.00	2,598.75		2,598.75	1.25
81 J2	For maintenance of Auto of 1st Assistant Supt. of Streets	780.00	759.00		759.00	21.00
81 L	Impersonal	250.00				250.00
81 S1	For all other expenses of operation and administration	1,760.00	1,727.28		1,727.28	32.72
	Total	$ 71,130.00	$ 68,550.03		$ 68,550.03	$ 2,579.97
Public Utility Inspection:						
81 A30	Salaries and wages	$ 67,500.00	$ 67,500.00		$ 67,500.00	
81 A31	Salaries and wages (track elevation)	5,000.00	5,000.00		5,000.00	
	Totals	$ 72,500.00	$ 72,500.00		$ 72,500.00	
	Carried forward					

TABLE No. 1—Continued

		Appropriation	EXPENDITURES			Unexpended Balance
			Ordinary	Extraordinary	Total	
BUREAU OF STREETS—Continued: Brought Forward		$140,162.50	$133,498.13	....	$133,498.13	$ 6,6647.373
Field Supervision:						
81 A10	Salaries of Superintendents of wards, dumps, garbage collection, their foremen and clerks	$175,020.00	$170,474.15	....	$170,474.15	$ 4,545.85
81 J10	Maintenance of Autos of Ward Superintendents	25,040.00	24,487.63	....	24,487.63	552.37
	Total	$200,060.00	$194,961.78	....	$194,961.78	$ 5,098.22
Cleaning of Streets and Alleys, Removal of Snow, Street Sweepings, Collection and Removal of Garbage, Ashes and Miscellaneous Waste:						
81 L11	Telephone service	$ 3,500.00	$ 3,248.52	....	$ 3,248.52	$ 251.48
81 L50	Removal of garbage by boats—under contract	43,000.00	37,672.00	....	37.672.00	5,328.00
81 L43	Removal of street sweepings— contract with I. C. R. R. Co.	6,200.00	5,600.50	....	5,600.50	599.50
81 S2	Maintenance of street signs	11,000.00	3,985.37	....	3,985.37	7,014.63
81 S	For cleaning of streets, collection and removal of garbage, ashes and miscellaneous refuse, and for the repair of unimproved streets, sidewalks and miscellaneous street work and for the maintenance and equipment of buildings	3,598,900.00	3,598,524.50	....	3,598,524.50	375.50
82 C10	Purchase of paper burners, can carrying carts, etc.	2,000.00	888.03	....	888.03	1,111.97
82 C11	Material and supplies					
85 S41	For enabling the Commissioner's to carry out provisions of Section 2074½ Chicago Code of 1911	9,500.00 1,000.00	9,499.58	....	9,499.58	.42 1,000.00
85 D	For purchase of new equipment	43,000.00	40,500.00	....	40,500.00	2,500.00
	Total	$3,718,100.00	$3,699,918.50	....	$3,699,918.50	$ 18,181.50
Waste Disposal Building and Equipment Bond Fund:						
481 X50	For the purchase of land for dumps, loading stations and incinerators and for the construction of loading stations, incinerators and accessories as may be ordered by the City Council.	$262,793.85	....	....	....	$262,793.85
	Total	$262,793.85	....	....	....	$262,993.85
Street or Alley Improvement or Repairs (To be paid from Vehicle Tax License) Administration and Superintendence:						
280 A1	Salaries and wages	$30,420.00	$ 26,311.23	....	$ 26,311.23	$ 4,108.77
280 H	Printing stationery and office supplies	1,000.00	935.62	....	935.62	64.38
280 J	Passenger transportation	1,000.00	997.00	....	997.00	3.00
	Carried forward	$140,162.50	$133,498.13	....	$133,498.13	$ 6,664.

BUREAU OF STREETS—Continued:						
280 J1	Compensation for use of personally owned autos of 3rd Ass't Supt. of Sts., General Asphalt Foreman, etc.	3,326.00	3,321.95		3,321.95	4.05
280 D	Machinery and vehicles (other than asphalt plant)	11,280.00	10,280.00		10,280.00	1,000.00
280 S41	For all other expenses of operation and administration	1,800.00	1,702.35		1,702.35	97.65
280 S40	Maintenance of equipment	70,000.00	67,911.65		67,911.65	2,088.35
280 S	For repairing permanent pavements and oiling, screening, and repairing macadam pavements, including labor, the hire of teams, horses and carts, repairs or replacements by contract or open order, material for repairs or replacements, purchase of equipment, etc	820,394.00	815,706.02		815,706.02	4,687.98
280 W	Additional capital expended under direction of the Committee Commissioner	35,000.00	35,000.00		35,000.00	
	Total	$974,220.00	$962,165.82		$962,165.82	$ 12,054.18
	Total Bureau of Streets	$5,298,803.85	$4,998,096.13		$4,998,096.13	$300,707.72
BUREAU OF SEWERS:						
Superintendence						
90 A	Salaries	$ 26,140.00	$ 26,089.28		$ 26,089.28	50.72
90 C	Material and supplies	10,000.00	9,934.20		9,934.20	65.80
90 H	Printing, stationery and office supplies	1,003.50	1,002.75		1,002.75	.75
90 J	Passenger transportation	2,846.50	2,835.56		2,835.56	10.94
90 S	All other expenses of operation and administration	8,500.00	8,009.72		8,009.72	490.28
	Total	$ 48,490.00	$ 47,871.51		$ 47,871.51	$ 618.49
House Drains:						
90 A10	Salaries	$ 42,774.00	$ 42,773.56		$ 42,723.56	50.44
	Total	$ 42,774.00	$ 42,723.56		$ 42,723.56	$ 50.44
Repairing Sewers:						
90 A30	Salaries and wages	$ 53,900.00	$ 53,845.58		$ 53,845.58	$ 54.42
90 C30	Covers, lids and material for manholes and catch basins ($12,000 reimbursed from vehicle tax)	20,000.00	19,686.30		19,686.30	313.70
90 K30	Hire of teams, horses and carts	18,283.00	17,095.00		17,095.00	1,188.00
	Total	$ 92,183.00	$ 90,626.88		$ 90,626.88	$ 1,556.12
290 C30	To reimburse Corporate purposes for expenditures made during 1919, account 90 C 30 for repairs for manhole covers, catch basins, etc.	$ 16,000.00	$ 16,000.00		$ 16,000.00	
	Total	$ 16,000.00	$ 16,000.00		$ 16,000.00	
Inspection:						
90 A31	Mason inspection	$ 8,880.00	$ 8,730.00		$ 8,730.00	$ 150.00
90 A32	Inspection and other services	4,500.00	3,826.83		3,826.83	673.17
	Total	$ 13,380.00	$ 12,556.83		$ 12,556.83	$ 823.17
	Carried forward					

TABLE No. 1—Continued

		Appropriation	EXPENDITURES			Unexpended Balance
			Ordinary	Extraordinary	Total	
BUREAU OF SEWERS—Continued. Brought forward						
Cleaning Sewers:						
90 A40	Salaries	$ 15,960.00	$ 15,960.00	....	$ 15,960.00	....
90 A41	Salaries and wages of assistant foreman, laborers and motor truck drivers	186,460.00	186,021.04	....	186,021.04	438.96
90 K40	Hire of teams, horses and carts	48,000.00	47,889.75	....	47,889.75	110.25
90 D40	Purchase of tractors and trucks	4,757.00	42.57	....	42.57	4,714.43
90 F40	Fuel light and power	6,300.00	5,593.85	....	5,593.85	706.15
	Total	$261,477.00	$255,507.21	....	$255,507.21	$ 5,969.79
90 E50	Restoration of streets by contract or open order	$ 11,100.00	$ 11,093.98	....	11,093.98	$ 6.02
	Total	$ 11,100.00	$ 11,093.98	....	$ 11,093.98	$ 6.02
Construction and Betterments:						
90 S50	Sewer reconstruction and repairs, including sewer outfalls, new catch basins and connecting sewers	$ 6,000.00	$ 5,098.00	....	$ 5,098.00	$ 902.00
90 S51	Betterment of sewer yards, such as roads, walks, trees, etc	200.00	194.45	....	194.45	5.55
	Total	$ 6,200.00	$ 5,292.45	....	$ 5,292.45	$ 907.55
90 S52	Surveys and bench monuments	$ 1,000.00	$ 942.57	....	$ 942.57	57.43
	Total Bureau of sewers	$492,604.00	$482,614.99	....	$482,614.99	$ 9,989.01
BUREAU OF ENGINEERING:						
Division of Bridges and Viaducts Superintendence:						
91 A1	Salaries—office	$ 11,360.00	$ 11,253.83	....	$ 11,253.83	$ 106.17
91 A5	Salaries, examination, inspection, maintenance and repair	19,440.00	17,995.38	....	17,995.38	1,444.62
91 J	Maintenance of autos personally owned	1,200.00	1,113.30	....	1,113.30	86.70
91 C1	Signals for bridges	2,500.00	37.00	....	37.00	2,463.00
91 E	Repairs by contract, or open order	250,000.00	249,157.46	....	249,157.46	842.54
91 E1	For maintenance and renewal of bridge and viaduct pavements (to be reimbursed from vehicle tax fund)	50,000.00	49,952.33	....	49,952.33	47.67
91 E2	For painting of bridges	25,000.00	24,999.01	....	24,999.01	.99
91 S	For all other expenses of operation and administration	5,800.00	4,871.62	....	4,871.62	928.38
	Totals	$ 365,300.00	$ 359,379.93	....	$ 359,379.93	$ 5,920.07

BUREAU OF ENGINEERING—Continued:						
291 E	To reimburse Corporate purposes funds for expenditures made during 1919 for repairs by contract or open order (for maintenance and renewals of bridge and viaduct pavements)	$ 50,000.00	$ 50,000.00		$ 50,000.00	
	Totals	$ 50,000.00	$ 50,000.00		$ 50,000.00	
Construction of New Bridges, to be paid for out of the proceeds of the sale of Bridge Bonds:						
491 X1	For surveys and investigations	$ 2,500.00		$ 2,351.93	$ 2,351.93	$ 148.07
491 X2	For paving approaches to Belmont Avenue Bridge	17,500.00		17,500.00	17,500.00	
491 X3	Adams Street Bridge	50,000.00		880.99	880.99	49,119.01
491 X4	For pavement of 92nd Street Bridge	15,000.00				15,000.00
491 X6	12th Street Bridge	1,230,000.00		220,145.33	220,145.33	1,009,854.67
491 X9	Weed Street Bridge	1,000.00				1,000.00
491 X10	Approaches to South California Avenue Bridge	30,000.00		149.09	149.09	29,850.91
491 X11	Fuller Street Bridge	1,000.00				1,000.00
491 X15	Madison Street Bridge	930,000.00		61,383.37	61,383.37	868,616.63
491 X16	Clark Street Bridge	30,000.00		26,517.11	26,517.11	3,482.89
491 X18	106th Street Bridge	1,000.00		8.51	8.51	991.49
491 X19	134th Street Bridge	100,000.00				100,000.00
491 X31	100th Street Bridge	264,500.00				264,500.00
491 X32	La Salle Street Bridge	5,000.00		2,130.98	2,130.98	2,869.02
491 X33	Lawrence Avenue Bridge	58,000.00		57,623.71	57,623.71	376.29
491 X36	Franklin-Orleans Street Bridge	740,000.00		471,740.49	471,740.49	268,259.51
491 X37	Kimball Avenue Bridge	75,000.00		43,286.00	43,286.00	31,714.00
491 X38	On or near Carpenter Street Bridge	1,000.00				1,000.00
491 X39	Polk Street Bridge	1,000.00				1,000.00
491 X41	Taylor Street Bridge	1,000.00				1,000.00
491 X42	Van Buren Street Bridge	1,000.00		17.24	17.24	982.76
491 X43	Wells Street Bridge	1,437,000.00		239,393.07	239,393.07	1,197,606.93
491 X44	Crawford Avenue two (2) Bridges	10,000.00				10,000.00
491 X45	Addison Street Bridge	170,000.00		55,281.04	55,281.04	114,718.96
491 X46	South Lawndale Avenue Bridge	50,000.00		14,614.85	14,614.85	35,385.15
491 X47	Monroe Street Bridge	63,000.00		60,340.48	60,340.48	2,659.52
	Totals	$ 5,284,500.00		$ 1,273,364.19	$ 1,273,364.19	$ 4,011,135.81
12th Street Viaduct Bond Funds:						
491 X100	For viaduct on east and west 12th street from Canal street to Wabash ave., including engineering inspection and incidentals	$ 1,200,000.00		$ 632,821.24	$ 632,821.24	567,178.76
	Total	$ 1,200,000.00		$ 632,821.20	$ 632,821.24	$ 567,178.76
	Total Bureau of Engineering	$ 6,899,806.00	$ 409,379.93	$ 1,906,185.43	$ 2,315,565.36	$ 4,584,234.64

TABLE No. 1—Continued

		Appropriation	EXPENDITURES			Unexpended Balance
			Ordinary	Extraordinary	Total	
BUREAU OF RIVERS AND HARBORS:						
Harbor Master:						
92 A1	Salaries—office	$ 13,668.69	$ 13,668.69		$ 13,668.69	$
92 A2	Salaries and wages—river service	35,981.31	35,949.23		35,949.23	32.08
92 A3	Salaries—bridgetenders, ferrymen and junior clerk	362,900.00	362,803.19		362,803.19	96.81
92 C	Material and supplies	5,400.00	5,399.87		5,399.87	.13
92 E	Repairs by contract or open order	1,400.00	1,390.53		1,390.53	9.47
92 G	Printing stationery and office supplies	150.00	138.10		138.10	11.90
92 H	Printing stationery and office supplies	550.00	496.47		496.47	53.53
92 J	Passenger transportation	450.00	424.10		424.10	25.90
92 F	Fuel light and power	8,500.00	8,499.75		8,499.75	.25
92 L	Telephone service	2,050.00	2,017.18		2,017.18	32.82
92 L1	Other impersonal service	10.00	2.00		2.00	8.00
92 B	Personal service	50.00	28.60		28.60	21.40
	Total Bureau River and Harbors	$ 431,110.00	$ 430,817.71		$ 430,817.71	$ 292.29
APPROPRIATION AND EXPENDITURES OF BOND FUNDS FOR PURPOSES NOTED BELOW:						
474 X1	For construction and equipment of Contagious Diseases Hospital Ward building No. 2	$ 189,597.19		$ 152,711.08	$ 152,711.08	$ 36,886.11
474 X2	Construction and equipment of Contagious Disease Hospital as may be ordered by the City Council	78,115.84				78,115.84
474 X10	For the purpose of renting or acquiring premises or sites and constructing and equipping Public Comfort stations as may be ordered by the City Council	142,161.09		3,948.73	3,948.73	138,212.36
	Total	$ 409,874.12		$ 156,659.81	$ 156,659.81	$ 253,214.31
	Total Corporate Funds	$ 15,828,912.76	$ 8,032,651.86	$ 2,407,704.25	$ 10,440,356.11	$ 5,388,556.65

TABLE No. 2

Statement of Expenditures of Bureau of Streets for the Year 1919

General Superintendence:		
Office salaries and expenses	$ 68,550.03	
Salaries—superintendents of wards, dumps, garbage collection, their foremen and clerks	170,474.15	
Maintenance of personally owned autos of ward superintendents	24,487.63	$263,511.81
Street and Public Utility Inspection		72,500.00
Cleaning streets and alleys, removal of snow, collection and removal of garbage, ashes and miscellaneous refuse, repair of unimproved streets and sidewalks and purchase of new equipment		3,699,918.50
Street or Alley Repairs Paid from Vehicle Tax Funds:		
Salaries	26,311.23	
Expenses	6,956.92	
Machinery and vehicles	10,280.00	
Maintenance of equipment	67,911.65	
Repairing pavements, including oiling and screening macadam streets	815,706.02	
Addition to Capital account	35,000.00	962,165.82
Total		$4,998,096.13

TABLE No. 3

Detailed Statement of Ward Expenditures of Bureau of Streets for the Year 1919

Ward	Cleaning Streets and Alleys			Removal of Ashes and Rubbish			Removal of Garbage		Repairing Unimproved Streets, Sidewalks and Miscellaneous Street Work			Material and Tools	Snow Removal	Total
	Salaries and Wages	Hire of Teams, Carts and Trucks	Flushing and Alley Cleaning	Salaries and Wages	Hire of Teams, Carts and Trucks	Paper Burning	Salaries and Wages	Hire of Teams, Carts and Trucks	Salaries and Wages	Hire of Teams, Carts and Trucks	Ditching			
1	$ 238,976.83	$ 52,566.58	$22,467.55	$ 7,009.68	$ 36,284.00	....	2,369.03	$ 4,906.00	$ 992.00	$ 650.00	....	$10,303.11	$ 54,092.26	$ 430,617.04
2	25,718.50	4,926.00	2,899.17	6,372.39	43,488.83	2,782.80	3,648.91	7,973.00	....	....	....	545.04	....	98,354.64
3	23,718.69	4,759.50	1,912.78	7,695.72	38,799.83	766.85	3,498.70	9,121.00	....	....	....	777.29	600.00	91,650.36
4	22,537.72	4,201.00	1,134.00	4,912.06	25,650.50	1,130.30	3,029.97	4,273.00	15.00	24.00	....	764.77	938.15	68,610.47
5	27,512.15	1,739.00	523.90	2,515.93	22,659.50	2,203.50	2,196.68	6,157.50	28.80	9.00	....	516.05	344.80	66,406.81
6	20,827.85	3,685.50	1,353.98	4,885.38	23,613.00	1,583.91	2,531.21	7,029.00	....	....	....	707.17	575.71	66,792.71
7	20,241 87	4,231.50	947.90	7,254.35	31,049.00	1,399.35	3,794.47	9,531.00	....	....	....	461.02	....	78,910.46
8	11,964.71	595.00	585.63	5,929.00	26,185.00	531.68	....	....	469.71	71.50	14.80	352.50	201.83	46,901.36
9	16,545.93	2,696.50	....	7,069.59	30,679.00	1,388.97	2,573.44	5,474.00	603,45	858.00	160.25	614.05	386.05	69,049.23
10	17,853.88	5,992.50	787.05	2,612.89	23,909.67	5,676.44	1,300.66	5,802.00	3.65	86.00	....	751.60	456.63	65,232.97
11	16,952.19	3,847.00	892.00	2,270.16	22,190.00	2,319.24	1,096.32	4,739.00	....	....	....	712.11	433.05	55,451.07
12	17,566.70	2,094.00	425.00	2,072.87	24,874.00	2,534.75	1,263.20	7,386.00	....	....	....	334,45	....	58,550.97
13	26,101.69	5,010.00	1,076.21	4,559.29	45,460.00	1,618.57	1,874.09	11,044.00	272.16	160.00	....	1,079.91	179.95	98,435.87
14	30,595.32	6,928.00	1,589.44	4,221.50	43,916.00	787.95	4,629.09	8,041.00	....	....	....	729.53	....	101,437.83
15	25,673.10	6,793.50	616.00	4,395.30	46,504.00	3,793.91	6,371.71	12,405.00	110.95	209.00	....	497.49	....	107,369.96
16	16,844.55	4,686.50	1,342.0	2,989.52	23,605.00	543.07	2,993.37	7,125.00	....	....	....	199.47	813.49	61,141.97
17	24,241.39	5,421.50	2,200.07	4,446.75	26,067.00	1,602.75	3,098.60	4,994.00	3.75	....	....	401.65	2,580.30	75,057.76
18	80,664.15	21,810.00	4,625.20	2,742.45	37,597.01	519.20	1,255.17	7,350.00	159.38	108.00	....	927.85	11,126.33	168,884.74
19	32,937.01	8,814.50	3,352.55	4,347.31	38,490.00	3,921.15	1,276.49	4,796.00	....	....	....	917.58	2,032.52	100,885.11
20	29,151.01	3,784.50	1,677.25	4,040.88	26,598.00	2,201.70	1,281.72	3,360.00	....	....	....	373.63	2,551.25	75,019.94
21	29,246.07	11,559.50	5,449.75	6,536.37	48,873.50	1,027.50	3,415.65	4,915.00	19.50	12.00	....	714.81	6,523.12	118,292.77
22	28,127.44	5,881.50	3,679.20	3,019.45	37,993.00	3,227.60	3,379.75	5,020.00	45.00	....	....	947.03	1,694.69	93,014.66
23	20,091.13	6,664.90	4,590.35	6,371.41	59,894.30	1,226.53	2,661.16	7,924.50	11.15	....	....	802.22	....	110,237.65
24	17,094.35	4,882.00	827.10	4,734.03	33,897.50	226.06	2,878.58	7,397.00	....	....	....	190.83	538.10	72,665.55
25	28,285.91	5,345.00	1,822.30	9,119.54	53,309.50	357.10	2,170.37	14,377.00	96.25	50.00	....	552.19	....	115,485.16
26	26,322.35	5,319.50	....	4,373.87	45,506.00	....	5,556.15	11,566.50	....	....	....	346.94	....	98,991.31
27	24,497.86	4,415.50	1,217.87	8,325.99	41,617.50	....	2,914.46	17,482.00	1,129.35	1,301.75	....	2,034.62	....	104,936.90
28	19,398.13	4,343.00	702.00	3,009.66	31,349.50	829.15	4,593.76	7,341.00	....	....	....	452.88	481.65	72,500,73
29	23,136.87	2,332.50	1,014.36	3,547.94	30,262.00	2,767.51	1,402.33	7,289.00	790.20	902.00	395.50	2,264.37	1,533.06	77,637.64
30	24,289.46	3,437.00	951.00	4,567.24	27,019.50	840.05	2,940.51	7,383.00	....	....	....	568.06	....	71,995.82
31	15,467.22	2,756.00	362.80	4,070.72	32,082.50	111.10	6,420.72	7,318.00	....	....	....	424.60	....	69,013.66
32	22,154.26	4,642.50	647.35	10,430.21	49,011.00	1,214.12	5,571.35	11,686.00	280.55	259.00	....	787.23	357.00	107,040.57
33	33,526.43	7,201.00	....	10,810.93	52,978.33	....	5,451.82	17,900.00	349.35	716.00	....	1,025.57	2.45	129,961.88
34	18,232.34	5,827.50	1,070.25	5,285.38	46,900.50	3,548.60	2,356.02	14,749.00	....	....	....	457.41	....	98,427.00
35	26,264.63	3,529.50	245.55	5,586.45	50,055.83	....	1,903.55	14,699.00	35.50	18.00	....	310.27	....	102,648.28
	$1,082,759.69	$ 232,719.48	$72,987.56	$182,132.21	$ 1,278,369.80	$ 52,681.41	$103,699.01	$ 288,553.50	$ 5,415.70	$ 5,434.25	$ 570.55	$33,845.30	$ 88,442.39	$ 3,427,610.85

TABLE No. 4

Statement of Expenditures of Bureau of Sewers For the Year 1919

General Superintendence:		
Salaries and Expenses		$ 47,871.51
House Drains:		
Salaries		42,723.56
Repairing Sewers:		
Salaries and Wages	$ 53,845.58	
Hire of Teams, Horses and Carts	17,095.00	
Covers and lids for manholes and catch basins, $12,000.00 reimbursed from vehicle tax funds	19,686.30	90,626.88
Reimbursing Corporate Funds		16,000.00
Mason Inspection		12,556.83
Cleaning Sewers:		
Salaries and Wages	201,981.04	
Hire of Teams, Horses and Carts	47,889.75	
Expenses	5,636.42	255,507.21
Restoration of Streets—By Deposit		11,093.98
Construction and Betterments		5,292.45
Surveys and Bench Monuments		942.57
Total		$ 482,614.99

TABLE No. 5

Statement of Expenditures of Bureau of Parks, Public Playgrounds and Bathing Beaches for the Year 1919

Superintendence:		
Salaries		$ 14,610.70
Forestry:		
Salaries and Wages		13,009.56
Bathing Beaches and Pools:		
Salaries and Wages		71,858.47
Extra Life Guard Service:		
Salaries and Wages		8,294.43
Material and Supplies	$ 12,034.47	
Repairs	6,449.59	
Fuel, Light and Power	3,186.08	
All other Expenses	9,375.11	31,045.25
Construction and Betterment—Beaches and Natatoriums		6,342.91
Division of Playgrounds:		
Salaries and Wages	355,063.96	
Material and Supplies	44,013.26	
Repairs	16,086.32	
Fuel, Light and Power	5,298.47	
All Other Expenses of Operation	15,071.44	
Construction and Betterments	50,586.81	486,120.26
Bathing Beach Bond Funds:		
For Alterations and General Improvements at various Beaches		55,437.03
Total		$ 686,718.61

TABLE No. 6

Statement of Expenditures of Bureau of Waste Disposal For the Year 1919

Superintendence:		
Salaries and Expenses		$ 10,253.62
Municipal Reduction Plant:		
Salaries and Wages, Hire of Teams, Horses and Carts	$314,958.27	
Repairs	36,299.85	
Fuel, Light and Power	113,745.95	
Material, Supplies and all other Expenses of Operation	83,500.54	548,504.61
Bridewell Incinerator:		
Salaries and Wages	9,115.00	
Fuel, Light and Power	7,723.68	
All other Expenses of Operation	873.31	17,711.99
Waste Disposal Building and Equipment Bond Fund		
For the Completion of Program Approved by the City Council		105,906.04
Municipal Reduction Plant Bond Funds:		
Condensors, Percolators, Evaporators, etc		2,960.00
Total		$ 685,336.26

TABLE No. 7

Statement of Expenditures of Bureau of Engineering Corporate Fund for the Year 1919

Superintendence:		
Office Salaries		$ 11,253.83
Bridges and Viaducts—For examination, inspection, maintenance and repairs:		
Salaries	$ 17,995.38	
Repairs	249,157.46	
Painting	24,999.01	
Repair and Renewals of Pavements	49,952.33	
All Other Expenses of Operation	6,021.92	348,126.10
To Reimburse Corporate Fund for Expenditures		50,000.00
Construction from Proceeds of Sale of Bridge Bonds:		
For Surveys and Investigations	2,351.93	
Approaches to Belmont Avenue Bridge	17,500.00	
Adams Street Bridge	880.99	
12th Street Bridge	220,145.33	
Approaches to South California Avenue Bridge	149.09	
Madison Street Bridge	61,383.37	
Clark Street Bridge	26,517.11	
106th Street Bridge	8.51	
La Salle Street Bridge	2,130.98	
Lawrence Avenue Bridge	57,623.71	
Franklin-Orleans Street Bridge	471,740.49	
Kimball Avenue Bridge	43,286.00	
Van Buren Street Bridge	17.24	
Wells Street Bridge	239,393.07	
Addison Street Bridge	55,281.04	
South Lawndale Avenue Bridge	14,614.85	
Monroe Street Bridge	60,340.48	1,273,364.19
12th Street Viaduct Bond Fund:		
Viaduct on East and West 12th Street		$ 632,821.24
Total		$2,315,565.36

TABLE No. 8

Statement of Corporate Fund Revenue of Department of Public Works For the Year 1919

ORDINARY ACCOUNTS:		
Commissioner's Office:		
House Drain Layers' Licenses		$ 1,840.00
Bureau of Compensation:		
Bridges over Streets and Alleys	$ 1,349.95	
Bulkheads, Platforms, etc.	2,456.70	
Canopies	1,213.89	
Scales	275.00	
Sub-sidewalk and Alley Space	6,427.20	
Switch Tracks	12,786.65	
Use of Streets, Alleys and Docks	4,203.33	
Vacation of Streets and Alleys	100,265.35	
Miscellaneous	1,002.25	
Space Permits	23,135.29	
Sub-sidewalk Permits	2,588.00	
Scale Permits	3,816.60	159,520.21
Bureau of Maps and Plats:		
Fees for Legal Descriptions		1,059.25
Bureau of City Hall:		
Sale of Old Material		527.85
Bureau of Parks, Public:		
Clarendon Beach admissions	20,258.25	
51st Street Beach admissions	5,110.47	
76th Street Beach admissions	7,645.65	
Rogers Park Beach admissions	157.20	
Reimbursements of Current Expense	81.28	
Sale of Farm Products	88.38	
Sale of Old Material	20.01	
Miscellaneous	14.50	33,375.74
Bureau of Waste Disposal:		
Reimbursements of Current Expenses	8.63	
Garbage Grease	204,831.73	
Tankage	105,347.94	
Rags, Tin Cans, etc	11,406.48	
Miscellaneous	709.48	322,304.26
Municipal Pier:		
Docking Permits	6,054.99	
Leases	78,604.55	
Reimbursements of Current Expense	7,774.94	
Sale of Old Material	50.00	
Miscellaneous	72.45	92,556.93
Bureau of Streets:		
Cement Walk Permits	2,475.00	
House Moving Permits	1,272.00	
Use of Streets from Special Deposits	4,150.00	
Rent of Garbage Boxes	10.00	
Cleaning Right of Way of Traction Companies	369,250.80	
Public Utility Inspections	61,510.50	
Sale of Old Material	718.40	
Reimbursements of Current Expense	16.50	439,403.20
Bureau of Sewers:		
House Drain Permits	23,886.90	
Mason and Junction Setters Permits	1,245.00	
Public Utility Inspection	3,526.83	
Reimbursement of Current Expense	300.00	
Sale of Old Material	416.51	
Miscellaneous	2.20	29,377.44
Bureau of Engineering:		
Reimbursement of Current Expense	2.88	
Bridges and Viaducts	13,553.26	
Public Utility Inspections	30.52	13,586.66
Bureau of Rivers and Harbors:		
Harbor Permits	4,934.62	
Maintenance of Bridges and Viaducts	7,880.39	12,815.01
South Chicago Municipal Market:		
Rent of Space		4,037.50
Totals		$1,110,404.05

TABLE No. 9

Statement of Appropriations and Expenditures for the Year 1919—Water Fund Accounts

		Appropriation	EXPENDITURES			Unexpended Balances
			Ordinary Accounts	Extraordinary Accounts	Totals	
DEPARTMENT OF FINANCE—Interest:						
121 P2	**Interest on Judgments**	$ 1,000.00	$ 185.86	....	$ 185.86	$ 814.14
121 P4	**Interest on Water Pipe Extension Certificates**	5,000.00	2,540.35	....	2,540.35	2,459.65
121 P5	**Interest on Water Certificates**	10,000.00	7,500.00	....	7,500.00	2,500.00
	Total Interest—Water	$ 16,000.00	$ 10,226.21	....	$ 10,226.21	$ 5,773.79
Department of Finance—Miscellaneous:						
122 A2	For payment of salaries of employes, absent on military leave when ordered reinstated by the City Council	$ 4,500.00	$ 3,762.41	....	$ 3,762.41	$ 737.59
122 J	Automobile hire for all departments	800.00	795.42	....	795.42	4.58
122 L6	Premium on Fidelity and City Employees' Bonds	600.00	565.00	....	565.00	35.00
122 M1	For payment of claims on account of moneys deposited in the Water Fund from Unclaimed Wages Account, Suspense Account, and refunding duplicate payments and payments made in error	500.00	....	....	....	500.00
122 M4	Claims under Workmen's Compensation Act	30,000.00	22,755.25	....	22,755.25	7,244.75
122 R	Rents, Real Estate and Buildings (Bureau of Engineering)	3,261.00	3,067.67	....	3,067.67	193.33
122 R1	Taxes and Special Assessments on Water Fund Property	8,000.00	7,630.59	341.24	7,971.83	28.17
122 S	To reimburse Corporate Purposes Fund for the percentage of expenditures in various departments having an expense common to both Corporate and Water Funds	800,000.00	758,250.20	....	758,250.20	41,749.80
122 S3	For contingent and miscellaneous and other expense for water purposes, to be expended under the direction of the Committee on Finance	5,680.00	5,368.96	....	5,368.96	311.04
122 V	For payment of Judgments	15,000.00	14,804.12	....	14,804.12	195.88
122 V1	For payment of Water Pipe Extension Certificates and the redemption of such other Water Certificates as shall be ordered paid by the City Council	32,900.00	25,945.96	....	25,945.96	6,954.04
122 V2	For payment of Water Certificates due July 1, 1919	500,000.00	500,000.00	....	500,000.00	....
122 V3	For payment of 90 per cent refunds of Special Assessments paid for water supply pipes and water service pipes	21,320.00	....	17,495.29	17,495.29	3,824.721
	Total—Miscellaneous	$1,422,561.00	$1,342,945.58	$ 17,836.53	$1,360,782.11	$ 61,778.89

BOARD OF LOCAL IMPROVEMENTS:						
150 A	Junior Clerk to handle refund vouchers for laying water supply pipe	1,500.00	1,500.00	....	1,500.00	....
150 R	Public Benefits including interest (Water Supply Pipes)	30,020.01	....	15,701.22	15,701.22	14,318.79
	Totals	$ 31,520.01	$ 1,500.00	$ 15,701.22	$ 17,201.22	$ 14,318.79
BUREAU OF ENGINEERING:						
City Engineer's Office:			$			
101 A1	Salaries and Wages	$ 46,760.00	45,186.68	....	$ 45,186.68	$ 1,573.32
101 B1	Personal services	500.00	72.00	....	72.00	428.00
101 H1	Printing, stationery and office supplies	2,200.00	1,757.14	....	1,757.14	442.86
101 S1	For all other expenses of operation and administration	400.00	399.33	....	399.33	.67
101 S41	For preliminary studies and preparation of plans and estimates for the extension of the water system	5,000.00	4,608.68	332.73	4,941.41	58.59
	Totals	$ 54,860.00	$ 52,023.83	$ 332.73	$ 52,356.56	$ 2,503.44
Fullerton Avenue Pumping Station:						
105 B11	Personal services	$ 960.00	$ 960.00	....	$ 960.00	....
105 F11	Fuel, light and power	1,080.00	843.58	....	843.58	236.42
105 S11	For all other expenses of operation and administration	750.00	375.70	....	375.70	374.30
	Totals	$ 2,790.00	$ 2,179.28	....	$ 2,179.28	$ 610.72
Sewage Pumping Stations—Salaries and Wages:						
105 A12	Ninety-fifth Street	$ 21,906.75	$ 21,783.28	....	$ 21,783.28	$ 123.47
105 A13	Stony Island Avenue	22,472.50	21,961.78	....	21,961.78	510.72
105 A14	Kensington	11,720.09	11,632.13	....	11,632.13	87.96
105 A15	Pullman	7,841.59	7,703.06	....	7,703.06	138.53
105 A16	Hegwisch	6,288.89	6,218.96	....	6,218.96	69.93
105 A22	Rogers Park	9,124.29	9,098.51	....	9,098.51	25.78
105 A23	For one day relief in seven for Assistant Operating Engineers, Oilers and Firemen	4,350 00	3,424.67	....	3,424.67	925.33
	Totals	$ 83,704.11	$ 81,822.39	....	$ 81,822.39	$ 1,881.72
Sewage Pumping Stations—Miscellaneous:						
105 A18	Laborers as required for cleaning suction wells	$ 575.00	$ 464.12	....	$ 464.12	$ 110.88
105 B10	Personal services	935.00	602.25	....	602.25	332.75
105 C10	Material and Supplies (Operation)	2,604.60	2,297.45	....	2,297.45	307.15
105 C12	Material and Supplies (Maintenance)	4,177.00	2,652.95	....	2,652.95	1,524.05
105 D10	Machinery and Vehicles	450.00	118.00	....	118.00	332.00
105 E10	Repairs by contract or open order	9,140.00	7,302.23	....	7,302.23	1,837.77
105 F10	Fuel, Light and Power	32,034.00	26,872.15	....	26,872.15	5,161.85
105 G10	Furniture and Fixtures	210.00	20.42	....	20.42	189.58
105 H10	Printing, stationery and office supplies	242.75	13.44	....	13.44	229.31
105 J10	Passenger transportation	124.00	86.70	....	86.70	37.30
105 K10	Hire of Teams, Carts and Trucks	100.00	48.00	....	48.00	52.00
105 L10	Impersonal services	720.00	544.50	....	544.50	175.50
105 J11	Automobile service	200.00		....	....	200.00
	Totals	$ 51,512.85	$ 41,022.21	....	$ 41,022.21	$ 10,490.14

TABLE No. 9—Continued

	Appropriation	EXPENDITURES			Unexpended Balances
		Ordinary Accounts	Extraordinary Accounts	Totals	
BUREAU OF ENGINEERING:					
Superintendence of Pumping Stations and Cribs:					
106 A1 Salaries and Wages	$ 20,940.00	$ 19,521.38		$ 19,521.38	$ 1,418.62
Totals	$ 20,940.00	$ 19,521.38		$ 19,521.38	$ 1,418.62
Pumping Stations—Salaries and Wages:					
106 A11 Chicago Avenue	$ 80,764.61	$ 77,631.99		$ 77,631.99	$ 3,132.62
106 A12 Fourteenth Street	73,185.60	70,449.59		70,449.59	2,736.01
106 A14 Harrison Street	38,139.97	37,303.89		37,303.89	836.08
106 A15 Twenty-second Street	61,626.04	57,948.12		57,948.12	3,677.92
106 A16 Sixty-eighth Street	72,354.51	70,248.50		70,248.50	2,106.01
106 A17 Lake View	64,380.46	62,844.42		62,844.42	1,536.04
106 A18 Central Park Avenue	70,034.59	69,335.71		69,335.71	698.88
106 A19 Springfield Avenue	71,569.59	65,331.56		65,331.56	6,238.03
107 A23 Roseland	62,686.66	60,046.02		60,046.02	2,640.64
106 A24 Mayfair	64,746.54	64,746.00		64,746.00	.54
106 A25 For one day relief in seven for Assistant Engineer, oilers, firemen, water tenders and coal passers	30,210.00	17,145.46		17,145.46	13,064.54
Totals	$ 689,698.57	$ 653,031.26		$ 653,031.26	$ 36,667.31
Pumping Stations—Miscellaneous:					
106 B10 Personal Services	$ 13,120.00	$ 12,527.74		$ 12,527.74	$ 592.26
106 C10 Material and Supplies (Operation)	62,500.00	55,960.20		55,960.20	6,539.80
106 C11 Chlorine and Distribution	48,000.00	47,861.32		47,861.32	138.68
106 C12 Material and Supplies (Material for Repairs)	98,000.00	81,354.49		81,354.49	16,645.51
106 D10 Machinery and Vehicles	34,900.00	1,396.57	25,261.46	26,658.03	8,241.97
106 E10 Repairs by contract or open order	280,000.00	247,941.22		247,941.22	32,058.78
106 F10 Fuel, Light and Power (not including handling of coal)	882,269.00	799,596.81		799,596.81	82,672.19
106 G10 Furniture and Fixtures	1,600.00	1,176.48		1,176.48	423.52
106 H10 Printing, stationery and office supplies	1,300.00	1,064.05		1,064.05	235.95
106 J10 Passenger transportation	300.00	297.46		297.46	2.54
106 J11 Automobile service	2,400.00	2,206.60		2,206.60	193.40
106 K10 Hire of teams, carts and trucks ($6,850.00 for handling storage coal)	7,900.00	4,639.20		4,639.20	3,260.80
106 L10 Impersonal services and benefits	5,254.00	3,627.52		3,627.52	1,626.48
106 L11 Removal of cinders and rubbish	24,970.00	21,906.72		21,906.72	3,063.28
106 L12 Derrick service—handling coal	14,000.00	7,280.82		7,280.82	6,719.18
106 S10 For the improvement of Lincoln Parkway from East Pearson Street to East Chicago Avenue	1,000.00	130.75		130.75	869.25
Totals	$ 1,477,513.00	$ 1,288,967.95	$ 25,261.46	$ 1,314,229.41	$ 163,283.59

BUREAU OF ENGINEERING—Continued

Sixty-eighth Street Pumping Station Tunnel:						
106 M11	**Damages**	$ 1,000.00	$	$ 25.00	$ 25.00	$ 975.00
	Totals	$ 1,000.00	$	$ 25.00	$ 25.00	$ 975.00
General Office—Miscellaneous:						
107 S	**Maintenance of tunnel plants and shafts**	$ 5,000.00	$ 4,912.69		$ 4,912.69	$ 87.31
107 S1	**For payment of unpaid bills**	5,000.00	4,141.50		4,141.50	858.50
	Totals	$ 10,000.00	$ 9,054.19		$ 9,054.19	$ 945.81
Tunnels and Cribs:						
107 A30	Salaries and wages	$ 43,602.55	$ 36,807.49		$ 36,807.49	$ 6,795.06
107 B30	Personal services	75.00				75.00
107 C30	Material and supplies	4,000.00	2,234.29		2,234.29	1,765.71
107 D30	Machinery and vehicles	300.00				300.00
107 E30	Repairs by contract or open order	55,000.00	47,746.97		47,746.97	7,253.03
107 F30	Fuel, light and power	2,255.00	1,969.94		1,969.94	285.06
107 G30	Furniture and fittings	500.00	62.30		62.30	437.70
107 H30	Printing, stationery and office supplies	70.00	18.80		18.80	51.20
107 J30	Passenger transportation	16.60	16.10		16.10	.50
107 L30	Impersonal services and benefits	200.00	199.77		199.77	.23
107 L31	**Tug service**	17,200.00	17,184.14		17,184.14	15.86
107 L32	**Meals at cribs**	20,390.00	16,979.27		16,979.27	3,410.73
	Totals	$ 143,609.15	$ 123,219.07		$ 123,219.07	$ 20,390.08
Construction:						
116 X25	Marshall Boulevard Municipal Plant—For construction by city day labor of plant buildings, including power plant, equipment of buildings, connecting tunnels, fencing and improving of the grounds, including electrical feeder main to the Twenty-second Street Pumping Station, including liabilities and reserves on power plant	$ 75,000.00		$ 60,295.40	$ 60,295.40	$ 14,704.60
106 X13	Mayfair Pumping Station—Construction by city day labor of station complete, including pumping machinery, boiler plant, chimney, coal storage and improvement of grounds, including contract liabilities	237,000.00		222,067.42	222,067.42	14,932.58
107 X37	Wilson Avenue Tunnel System—Complete	135,000.00		126,233.04	126,233.04	8,766.96
107 X39	Chicago Avenue Pumping Station — Construction by city day labor of a new 7 foot water tunnel to connect shaft "D" with suction well in north engine room	41,200.00		38,369.73	38,369.73	2,830.27
	Carried forward,	$ 488,200.00		$ 446,965.59	$ 446,965.59	$ 41,234.41

TABLE No. 9—Continued

		Appropriation	EXPENDITURES			Unexpended Balance
			Ordinary Accounts	Extraordinary Accounts	Totals	
BUREAU OF ENGINEERING—Continued:	**Brought forward**	$ 488,200.00	....	$ 446,965.59	$ 446,965.59	$ 41,234.41
Construction:						
106 X11	Chicago Avenue Pumping Station—Construction by city day labor of new pump pit, removal of old compound pumping engines and installation of new centrifugal pumps complete. Estimated cost $320,000 to be expended in 1919	250,000.00	....	148,449.41	148,449.41	101,550.59
106 X19	Springfield Avenue Pumping Station—Construction by city day labor of boiler plant with appurtenances, including coal-conveying machinery, steam piping and necessary building changes. Amount necessary to complete	155,000.00	....	75,331.71	75,331.71	79,668.29
106 X18	Central Park Avenue Pumping Station—Construction by city day labor of a new boiler plant and appurtenances, including coal-conveyor, steam piping, and elvating of coal tracks, and necessary building changes to complete	50,000.00	....	29,520.28	29,520.28	20,479.72
106 X15	Twenty-second Street Pumping Station—Installation of two centrifugal pumps complete	84,000.00	....	48,090.21	48,090.21	35,909.79
106 X16	Sixty-eighth Street Pumping Station—One super-heater complete, with the necessary piping changes, damper and feed water regulators, oil filler system, electrically driven auxiliary boosters for pumping units No. 1 and No. 2, new stoker drives for boilers 5, 6 and 7 and soot blowers for all boilers	55,000.00	....	19,736.83	19,736.83	35,263.17
106 X162	Sixty-eighth Street Pumping Station—Installation of two centrifugal pumps	170,000.00	....	61,652.87	61,652.87	108,347.13
106 X161	Sixty-eighth Street Pumping Station—Installation of new feed water heaters, boiler feed pumps, platform for boiler feed pump, etc	14,000.00	....	7,295.68	7,295.68	6,704.32
106 X21	Roseland Pumping Station—New water backs, soot blowers and bafflers in boiler plant	1,500.00	....	....	....	1,500.00
106 X10	For construction of chlorinating plants at various pumping stations	5,000.00	....	1,947.38	1,947.38	3,052.62
107 X45	Western Avenue Tunnel—For the construction by city day labor of a water tunnel in 73rd street from South State street to the proposed William Hale Thompson Pumping Station. Total estimated cost $2,600,000.00, to be expended in 1919	473,800.00	....	81,743.96	81,743.96	392,056.04
106 X20	William Hale Thompson Pumping Station—For the construction by city day labor of station complete, including pumping machinery, boiler plant, chimney, coal storage and improvement of the grounds. Total estimated cost $1,500,000.00, to be expended in 1919	190,000.00	....	2,370.45	2,370.45	187,629.55
	Carried forward	$1,936,500.00	....	$ 923,104.37	$ 923,104.37	$ 1,013,395.63

BUREAU OF ENGINEERING—Continued	**Brought forward**	$1,936,500.00		$ 923,104.37	$ 923,104.37	$ 1,013,395.63
Construction:						
107 X31	Auxiliary Crib and Lake Tunnel Extension—For the construction by city day labor of a new water intake crib adjacent to the Carter H. Harrison Crib, including tunnels therefrom to a connection with lake tunnels at the two mile crib, including the removal of the old two mile crib, and temporary repairs to breakwater previous to the removal of crib, total estimated cost $900,000.00, to be expended in 1919	200,000.00		6,640.57	6,640.57	193,359.43
110 X33	Construction by city day labor of Water Pipe Tunnel and Shafts at new Michigan Avenue Bridge	25,000.00		3,601.32	3,601.32	21,398.68
106 X23	To reimburse Comptroller's Capital Account for Real Estate purchased for Roseland Pumping Station	2,200.00		2,200.00	2,200.00	
105 X12	Ninety-fifth Street Pumping Station—Changing bunkers on account of elevating switch tracks	7,700.00		7,448.70	7,448.70	251.30
105 X13	Construction and operation of temporary Sewage Pumping Plant at One Hundred and Eight Street and Avenue F	5,000.00		4,998.75	4,998.75	1.25
106 X14	Springfield Avenue Pumping Station—Switchtrack at Station and Yard "A" Water Pipe Extension	8,000.00		8,000.00	8,000.00	
106 X22	Clearing Booster Station—Construction of a Booster Station, including the payment of necessary line extensions by the Commonwealth Edison Company, and other auxiliary apparatus and machinery	10,000.00				10,000.00
	Totals	$2,194,400.00		$ 955,993.71	$ 955,993.71	$ 1,238,406.29
Water Pipe Extension Division—Administration and Operation:						
110 A	Salaries and Wages	$ 208,605.00	$ 204,387.22		$ 204,387.22	$ 4,217.78
110 B	Personal services	3,000.00	2,926.38		2,926.38	73.62
110 C	Materials and supplies	25,000.00	18,989.24		18,989.24	6,010.76
110 E	Repairs by contract or open order (**including repairs to District** Yards)	20,000.00	19,047.29		19,047.29	952.71
110 F	Fuel, light and power	6,400.00	1,719.00		1,719.00	4,681.00
110 G	Furniture and fixtures	500.00	495.60		495.60	4.40
110 H	Printing, stationery and office supplies	4,500.00	4,190.84		4,190.84	309.16
110 J	Passenger transportation	8,500.00	7,877.45		7,877.45	622.55
110 J1	Passenger transportation (automobile)	10,980.00	10,131.51		10,131.51	848.49
110 K	Hire of teams, carts and trucks	12,500.00	12,465.75		12,465.75	34.25
110 L	Impersonal services and benefits	3,500.00	3,495.12		3,495.12	4.88
110 M	Damages, refunds and miscellaneous claims	1,500.00	1,407.60		1,407.60	92.40
	Totals	$ 304,985.00	$ 287,133.00		$ 287,133.00	$ 17,852.00
Tapping Section:						
110 A10	**Salaries and Wages**	$ 23,590.00	$ 22,773.89		$ 22,773.89	$ 816.11
110 C10	**Materials and supplies**	18,000.00	14,975.01		14,975.01	3,024.99
110 K10	**Hire of teams, carts and trucks**	15,400.00	14,495.63		14,495.63	904.37
	Totals	$ 56,990.00	$ 52,244.53		$ 52,244.53	$ 4,745.47

TABLE No. 9—Continued

		Appropriation	EXPENDITURES			Unexpended Balances
			Ordinary Accounts	Extraordinary Accounts	Totals	
BUREAU OF ENGINEERING—Continued:						
Repairs, Renewals and Rehabilitation:						
110 A20	Salaries and Wages	$ 577,500.00	$ 574,505.62	....	$ 574,505.62	$ 2,994.38
110 A21	Cleaning of drinking fountains	5,000.00	4,959.31	....	4,959.31	40.69
110 B20	Horse-shoeing	500.00	297.70	....	297.70	202.30
110 C20	Materials and supplies (only such materials as enter into or become a part of the water distributing system)	50,000.00	39,789.24	....	39,789.24	10,210.76
110 C21	Materials and supplies (shop repairs to hydrants and valves)	7,500.00	3,531.17	....	3,531.17	3,968.83
110 E20	Restoration of street openings	60,000.00	59,998.01	....	59,998.01	1.99
110 K20	Hire of trucks	75,000.00	74,980.79	....	74,980.79	19.21
110 K21	Hire of teams	16,800.00	16,723.20	....	16,723.20	76.80
	Totals	$ 792,300.00	$ 774,785.04	$..............	$ 774,785.04	$ 17,514.96
Water Pipe Extension Division—Construction:						
110 DX	Additional trucks	$ 5,000.00	....	$ 3,125.88	$ 3,125.88	$ 1,874.12
110 X75	New discharge main at Chicago Avenue Pumping Station	75,000.00	....	58,116.22	58,116.22	16,883.78
110 X80	Private work laying water mains, making special taps, etc., for which special deposit has been made	100,000.00	....	70,217.52	70,217.52	29,782.48
110 X81	Extension of mains on approval and order of the City Council	362,500.00	....	358,783.44	358,783.44	3,716.56
110 X82	Installing meter connections in accordance with the provisions of the new meter ordinance	60,000.00	....	59,573.82	59,573.82	426.18
110 X83	Miscellaneous installation of hydrants, valves etc., for betterment of system	40,000.00	....	39,910.58	39,910.58	89.42
110 X84	Service Pipe Construction, etc., in accordance with special Council order	7,500.00	....	1,112.12	1,112.12	6,387.88
110 X103	Installation of pressure regulating valves at Springfield Avenue and Central Park Avenue Pumping Stations	5,000.00	....	4,816.61	4,816.61	183.39
	Totals	$ 655,000.00	....	$ 595,656.19	$ 595,656.19	$ 59,343.81
Water Meter Shops—Repairs, Purchase and Installation of Meters:						
115 A	Salaries and Wages	$ 15,065.00	$ 13,429.30	$ 1,596.21	$ 15,025.51	$ 39.49
115 A1	Salaries and Wages	60,080.00	51,890.85	5,534.86	57,425.71	2,654.29
115 B	Personal service	290.00	141.42	....	141.42	148.58
115 C	Material and supplies	20,000.00	8,491.23	3,063.04	11,554.27	8,445.73
115 C1	Water meters for renewals and replacements	18,105.00	16,949.00	....	16,949.00	1,156.00

BUREAU OF ENGINEERING—Continued:						
115 X	Water meters for new installation	95,200.00		92,921.75	92,921.75	2,278.25
115 D	Apparatus, etc.	650.00				650.00
115 E	Repairs by contract or open order	750.00	47.16		47.16	702.84
115 F	Fuel, light and power	3,565.00	2,508.91		2,508.91	1,056.09
115 G	Furniture and fixtures	200.00	71.17		71.17	128.83
115 H	Printing, stationery and office supplies	500.00	307.67		307.67	192.33
115 J	Passenger transportation	2,350.00	2,181.80		2,181.80	168.20
115 K	Hire of teams, carts and trucks	18,200.00	16,065.25		16,065.25	2,134.75
115 L	Impersonal service	1,000.00	317.03		317.03	682.97
	Totals	$ 235,955.00	$ 112,400.79	$ 103,115.86	$ 215,516.65	$ 20,438.35
Municipal Power Plant—For the cost of operation and maintenance (to be reimbursed to the Water Fund by the Municipal Shop Warehouse, Contagious Disease Hospital, Department of Gas and Electricity, Pumping Stations and House of Correction for amount of service given)						
116 A	Salaries and Wages	$ 23,252.97	$ 22,723.24		$ 22,723.24	529.73
116 B	Personal service including labor furnished by prisoners at Bridewell	18,584.00	8,314.36		8,314.36	10,269.64
116 C	Materials and supplies (necessary for operation)	1,460.00	1,459.21		1,459.21	.79
116 C1	Materials and supplies (necessary for repairs and maintenance)	2,530.00	2,373.76		2,373.76	156.24
116 E	Repairs by contract or open order	5,000.00	4,619.62		4,619.62	380.38
116 F	Fuel, light and power (not including handling)	73,500.00	31,401.76		31,401.76	42,098.24
116 G	Furniture and fixtures	75.00	27.80		27.80	47.20
116 H	Printing, stationery and office supplies	250.00	110.15		110.15	139.85
116 J	Passenger transportation	25.00	6.65		6.65	18.35
116 K	Hire of teams, carts and trucks	1,000.00				1,000.00
116 K	Totals	$ 125,676.97	$ 71,036.55		$ 71,036.55	$ 54,640.42
	Totals Bureau of Engineering	$6,900,934.15	$3,568,441.47	$1,680,384.95	$5,248,826.42	$ 1,652,107.73
BUREAU OF WATER:						
Superintendent's Office:						
170 A	Salaries and Wages	$ 8,640.00	$ 8,640.00		$ 8,640.00	
	Totals	$ 8,640.00	$ 8,640.00		$ 8,640.00	
Collection Division—General						
170 A1	Salaries and Wages	$ 29,130.00	$ 28,907.19		$ 28,907.19	$ 222.81
Assessed Rates Section:						
170 A2	Salaries and Wages	58,860.00	58,609.18		58,609.18	250.82
Meter Rates Section:						
170 A3	Salaries and Wages	82,480.00	82,425.22		82,425.22	54.78
Shut-Off Section:						
170 A4	Salaries and Wages	25,290.00	25,250.42		25,250.42	39.58
	Totals	$ 195,760.00	$ 195,192.01		$ 195,192.01	$ 567.99

TABLE No. 9—Continued

		Appropriation	EXPENDITURES			Unexpended Balances
			Ordinary Accounts	Extraordinary Accounts	Totals	
BUREAU OF WATER:						
Assessment Division—General:						
170 A5	**Salaries and Wages**	$ 130,900.00	$ 130,599.87		$ 130,599.87	$ 300.13
Permit and Map Section:						
170 A6	**Salaries and Wages**	16,870.00	16,869.99		$ 16,869.99	.01
	Totals	$ 147,770.00	$ 147,469.86		$ 147,469.86	300.14
Auditing Division:						
170 A7	**Salaries and Wages**	$ 20,560.00	$ 20,530.60		$ 20,530.60	$ 29.40
	Totals	$ 20,560.00	$ 20,530.60		$ 20,530.60	$ 29.40
Miscellaneous:						
170 A8	Overtime for annual balancing of the Assessed Rates Accounts and transcribing the assessed rates and meter rates ledgers	$ 6,800.00	$ 6,778.82		$ 6,778.82	$ 21.18
170A 9	Extra clerk hire for assisting on regular work and on transcribing of assessed and meter rates and meter mechanical ledgers	6,000.00	6,000.00		6,000.00	
170 K5	Hire of teams, carts and trucks (Shut-Off Section)	11,214.00	11,214.00		11,214.00	
170 K7	Hire of teams, carts and trucks (Meter Rates Secton)	41,296.00	41,296.00		41,296.00	
170 B	Personal services	1,200.00	1,182.03		1,182.03	17.97
170 C	Material and supplies	600.00	592.30		592.30	7.70
170 G	Furniture and fixtures	1,000.00	921.57		921.57	78.43
170 H	Printing, stationery and office supplies	31,000.00	31,000.00		31,000.00	
170 J	Passenger transportation	1,100.00	1,097.33		1,097.33	2.67
170 L	Impersonal services	25.00	11.65		11.65	13.35
170 M	Damages, refunds and miscellaneous claims	35,000.00	34,996.41		34,996.41	3.59
	Totals	$ 135,235.00	$ 135,090.11		$ 135,090.11	$ 144.89
	Totals, Bureau of Water	$ 507,965.00	$ 506,922.58		$ 506,922.58	$ 1,042.42
	Totals, Water Fund	$8,878,980.16	$5,430,035.84	$1,713,922.70	$7,143,958.54	$ 1,735,021.62

TABLE No. X

Statement of Water Fund Revenue of the Department of Public Works For the Year 1919

Ordinary Accounts:		
Assessed rates	$3,428,962.93	
Meter rates	4,303,025.01	
Water permits	28,714.00	
Meter mechanical receipts	1,798.48	
Assessor's miscellaneous	17,341.23	
Use of water by special deposits	1,387.39	
Rent of Rookery site	35,000.04	
Rent of real estate and buildings	2,962.22	
Rent of space in water pipe tunnels	1,256.51	
Sale of old material	2,464.03	
Interest on deposits of City funds	10,648.91	
Interest on investments of City funds	28,849.62	
Reimbursement of current expense	82,461.46	
Reimbursement of current expense Municipal Power Plant	59,208.68	
Use of water from Fullerton Avenue conduit	2,500.00	
Rebates on special assessments	16.95	
Interest on deposit with Commonwealth Edison Company	530.49	
Miscellaneous	723.79	
Total		$8,007,851.74

TABLE No. XI

Statement of Free Water Service Rendered by the Chicago Water Works During the Year 1919

	Classification	Amount
(A)	Fire hydrants, 31,556 at $40.00 each, based on hydrant rentals	$1,262,240.00
	Public parks	100,000.00
	Street cleaning and sprinkling	60,000.00
	Flushing sewers	11,270.00
	Track elevation and street improvements	5,000.00
(B)	Public schools	117,993.10
	Police department	4,417.50
	Fire department	3,753.34
	Public baths	3,110.50
	Small parks and playgrounds	8,365.65
	Hospitals	3,786.50
	Pumping stations	30,811.50
	Miscellaneous City property	9,853.85
	State and County institutions	42,458.14
	Churches and parsonages	48,094.89
	Parochial and private schools and colleges	42,311.88
	Hospitals	22,205.13
	Homes	17,709.93
	Miscellaneous religious, eductional and charitable institutions	11,299.64
	Total	$1,804,681.55

(A)—Estimated by City Engineer

(B)—Recorded as decreased upon the Records of the Bureau of Water—Assessed Rates $328,814.42; Meter Rates $37,357.13.

TABLE No. XII

Comparative Statement of Ordinary Revenue and Ordinary Expense of Water System for the Years 1902 to 1919 Inclusive

Year	Ordinary Revenue	Increase over Preceding Year	Per Cent Increase Over Preceding Year	Ordinary Expense	Increase over Preceding Year	Per Cent Increase Over Preceding Year	Ordinary Excess of Revenue over Ordinary Expense	Per Cent Increase of Excess of Ordinary Revenue Over Ordinary Expense Over Preceding Yr.	Per Cent of Ordinary Expense to Ordinary Revenue
1902	$3,505,473.16	....	....	$1,787,925.13	....	....	$1,717,548.03	....	51.00
1903	3,818,884.11	$313,410.95	8.94	1,798,143.34	$ 10,218.21	.57	2,020,740.77	17.65	47.09
1904	4,086,936.35	268,052.24	7.02	1,946,187.54	148,044.20	8.23	2,140,748.81	5.94	47.62
1905	4,209,391.55	122,455.20	3.00	2,048,664.75	102,477.21	5.27	2,160,726.80	.93	48.67
1906	4,420,367.27	210,975.72	5.01	2,060,249.12	11,584.37	.57	2,360,118.15	9.23	46.61
1907	4,726,205.63	305,838.36	6.92	2,442,122.97	381,873.85	15.64	2,284,082.66	* 3.22	51.67
1908	4,953,640.30	227,434.67	4.81	2,702,811.40	260,688.43	10.67	2,250,828.90	* 1.45	54.56
1909	5,241,635.77	287,995.47	5.81	2,775,938.72	73,127.32	2.70	2,465,697.05	9.54	52.95
1910	5,685,006.60	443,370.83	7.80	2,815,497.06	39,558.34	1.40	2,869,509.54	16.37	49.52
1911	5,993,771.32	308,764.72	5.43	3,174,097.04	358,599.98	12.74	2,819,674.28	1.74	52.95
1912	6,527,925.73	534,154.41	8.91	3,588,640.40	414,543.36	13.06	2,939,285.33	4.24	54.97
1913	6,813,973.83	286,048.10	4.38	3,318,681.72	*269,958.68	* 7.52	3,495,292.11	18.92	48.69
1914	6,741,210.24	* 72,763.59	*1.07	3,193,881.75	*124,799.97	* 3.76	3,547,328.49	1.47	47.38
1915	6,448,247.04	*292,963.20	*4.34	3,287,548.18	* 93,666.43	* 2.93	3,160,698.86	*10.89	50.98
1916	6,796,646.39	348,399.35	5.40	3,530,028.24	242,480.06	7.37	3,266,618.15	3.35	51.93
1917	7,438,597.11	641,950.72	8.62	3,886,332.70	356,304.46	9.29	3,552,264.41	7.88	52.32
1918	7,625,134.54	186,537.43	2.45	4,621,941.15	735,608.45	15.91	3,003,193.39	*14.95	60.61
1919	8,007,851.74	382,717.20	4.78	4,854,359.85	232,418.70	4.78	3,153,491.89	4.76	60.62

* Decrease.

TABLE No. XIII

Statement of Water Fund Collections Duringthe Year 1919

Collection by Cashier of Bureau of Water:

Assessed rates	$3,428,962.93	
Meter rates	4,303,025.01	
Assessor's miscellaneous	17,341.23	
Permits	28,714.00	
Meter mechanical	1,798.48	
Suspense No. 1	58.23	
Suspense No. 2	363.70	
Total		$7,780,263.58

Collections by City Collector and City Treasurer on Warrants for Collection:

Use of water in construction of cement walks	$ 1,369.88	
Sale of old material of water works	1,026.78	
Advances for laying water mains, etc	51,373.20	
Services rendered City departments	35,436.91	
Rent of Rookery property	35,000.04	
Other rents	2,630.55	
Use of water from Fullerton Avenue conduit	1,000.00	
Compensation for running pipes and cables through water pipe tunnels under Chicago river	1,333.18	
Rebate on duplicate express charges	83.29	
Interest on deposit with Commonwealth Edison Co.	530.49	
Repairing damage to fence and wall at 22nd Street Pumping Station.	120.80	
Reimbursement of expense	256.16	
Total		$ 130,161.28

Collections by City Comptroller:

Interest on funds in the hands of City depositaries	$ 10,648.91	
Interest on investments	28,849.62	
Payment of water taxes, 1872-73	45.70	
Credits to expense, payroll accounts	515.95	
Pro rata share of taxes	16.95	
		$ 40,077.13
Total		$7,950,501.99

In addition to the above, special deposits amounting to $134,745.04 were collected by Cashier of Bureau of Water.

In addition to the above earnings, warrants for collection for labor performed and material furnished were collected by the City Collector and City Treasurer and credited as follows: Municipal Shops Capital Account $557,046.91; Water Works Suspense Stock Account $707,705.44; City Engineer Designing Division Capital Account $44,720.82; Water Pipe Extension Capital Account $326,266.78; Construction Division Capital Account $2,555,440.95; Testing Division Capital Account $43,099.70.

Refunds amounting to $34,996.41 were disbursed by the Cashier of Bureau of Water on account of wrong property, overpayment and erroneous assessments paid.

TABLE No. XIV

Statement of Expenditures for Operation of Water System including Interest During the Year 1919

Classification		Amount	Per Cent
General Superintendence:			
Salaries	$ 27,203.80		
Expenses	8,186.47	$ 35,390.27	1.1
Engineering Division:			
Salaries	$ 45,186.68		
Expenses	2,228.47	47,415.15	1.5
Cribs:			
Two-Mile	$ 17,272.11		
Four-Mile	10,619.39		
Lake View	7,978.33		
Hyde Park	13,314.72		
Carter H. Harrison	10,273.48		
Wilson Avenue	7.50	59,465.53	1.9
Tug Service		16,884.14	.5
Water Pumping Stations:			
14th Street	$189,252.29		
68th Street	234,837.52		
22nd Street	185,509.27		
Chicago Avenue	170,618.56		
Springfield Avenue	148,035.55		
Central Park Avenue	181,774.10		
Harrison Street	90,578.62		
Lake View	137,981.65		
Roseland	135,787.81		
Mayfair	132,451.01		
Jefferson Park	9.11	1,606,835.49	50.
Sewage Pumping Stations:			
95th Street	$ 29,051.54		
Stony Island Avenue	30,230.75		
Kensington	17,907.56		
Pullman	13,315.14		
Hegewisch	8,565.10		
Rogers Park	13,184.09	112,254.18	3.5
Assessment and Collection of Water Rates:			
Salaries	$440,533.22		
Expenses	36,761.91	477,295.13	14.9
Water Supply Investigation		3,295.38	.1
Services of City Departments		748,475.60	23.4
Municipal Power Plant		64,043.17	2.
Superintendence of Pumping Stations and Cribs		23,283.79	.7
Marshall Boulevard Municipal Plant		1,201.00	....
Municipal Shops Investigation		2,500.00	.1
Preliminary Studies for Extension of Water System		1,069.15	....
Taxes on City Property		2.97	....
Fullerton Avenue Pumping Station		1,917.93	....
Interest on Certificates and Judgments		10,226.21	.3
Costs on Judgments		70.50	....
Total		$3,211,625.59	100.

TABLE No. XV

Statement of Expenditures for Repairs and Renewals of Water Works Property and Equipment During the Year 1919

Classification		Amount	Per Cent
Cribs:			
Two-Mile	$ 2,422.22		
Four-Mile	2,159.37		
Lake View	7.82		
Hyde Park	42,623.68		
Carter H. Harrison	1,014.85	$ 48,227.94	2.9
Tunnels		4,912.69	.3
Water Pumping Stations:			
14th Street	$ 37,379.33		
68th Street	98,750.39		
22nd Street	25,054.44		
Chicago Avenue	41,190.38		
Springfield Avenue	18,795.93		
Central Park Avenue	33,121.71		
Harrison Street	21,682.19		
Lake View	24,426.74		
Roseland	19,813.70		
Mayfair	13,107.80		
Rogers Park	2,043.22	335,365.83	20.5
Sewage Pumping Stations:			
95th Street	$ 1,573.62		
Stony Island Avenue	3,715.23		
Kensington	1,291.26		
Pullman	248.96		
Hegewisch	2,700.54		
Rogers Park	1,060.81	10,590.42	.6
Water Pipe Extension:			
Mains, Hydrants and Valves	$1,064,040.71		
Tapping and Retapping	52,313.53	1,116,354.24	67.9
Municipal Power Plant		6,993.38	.4
Fullerton Avenue Sewage Pumping Station		261.35	
Special Assessments on City Property		7,627.62	.5
Meters		112,400.79	6.9
Total		$1,642,734.26	100.

TABLE No. XVI

Statement of Expenditures for Additions, Extensions and Betterments of Water Works Property and Equipment During the Year 1919

Classification		Amount	Per Cent
Land Tunnels:			
Wilson Avenue Tunnel	$ 126,233.04		
Western Avenue Tunnel	82,126.66		
Chicago Avenue Pumping Station Tunnel	38,436.64		
Sixty-eighth Street Connecting Tunnel	25.00	$ 246,821.34	14.4
Lake Tunnel:			
Auxiliary Crib and Lake Tunnel Extension		6,864.93	.4
Water Pipe Tunnel:			
Michigan Avenue Tunnel		3,601.32	.2
Water Pumping Stations:			
14th Street	$ 955.00		
68th Street	89,641.45		
22nd Street	48,117.50		
Chicago Avenue	148,449.41		
Springfield Avenue	83,331.71		
Central Park Avenue	42,151.01		
Roseland	2,200.00		
Wm. H. Thompson	2,370.45		
Mayfair	234,707.17	651,923.70	38.1
Sewage Pumping Stations:			
95th Street	$ 7,448.70		
108th Street (temporary)	4,998.75	12,447.45	.7
Water Pipe Extension:			
Mains, hydrants and valves	569,267.93		
Service pipes, taps, etc	10.95	569,278.88	33.2
Marshall Boulevard Municipal Plant		60,295.40	03.5
Meters		162,689.68	09.5
Total		$1,713,923.70	100.

TABLE No. XVII

Comparative Statement of Expenditures for Operation of Water System including Interest for the Years 1912 to 1919 inclusive

CLASSIFICATION	1912	1913	1914	1915	1916	1917	1918	1919
General Superintendence	$ 38,915.18	$ 45,330.64	$ 27,645.80	$ 29,380.55	$ 26,562.97	$ 27,985.46	$ 28,963.74	$ 35,390.27
Engineering Division	34,795.53	29,748.28	35,899.54	38,879.35	37,084.51	39,118.08	43,513.12	47,415.15
Testing Division	24,098.14	22,414.87	33,357.27	50.92	....	....	....	....
Electrolysis Surveys	3,983.68	1,747.96	2,301.42	2,760.52	7,252.30	2,431.85	....	....
Water Supply Investigation	2,725.90	5,337.16	437.90	1,089.65	2,774.70	8,437.03	1,329.11	8,295.38
Water Waste Surveys	122,800.00	39,237.43	....	....	7,066.45	21,020.03	....	....
Cribs	43,729.20	42,427.96	45,661.31	46,111.99	44,127.49	45,594.70	46,814.00	59,465.53
Tug Service	11,736.26	11,115.55	11,187.11	9,635.42	6,125.85	9,870.04	13,178.25	16,884.14
Pumping Stations	941,800.48	902,832.57	991,255.53	995,471.53	948,156.95	1,278,973.31	1,812,608.15	1,606,835.49
Assessment and Collection of Water Rates	329,724.83	299,900.84	320,773.43	339,474.29	353,528.62	362,806.15	397,157.12	477,295.13
Service of City Departments	421,420.03	452,800.14	249,327.29	278,356.11	753,642.65	718,175.50	702,291.30	748,475.60
Interest on Bonds, Certificates and Judgments	194,352.00	89,460.24	14,973.16	8,708.69	1,298.60	10,225.44	25,631.89	10,226.21
Costs on Judgments	154.81	59.71	132.57	83.95	102.70	55.50	76.25	70.50
Fullerton Ave. Sewage Pumping Station	8,068.45	2,419.04	1,998.75	1,808.11	1,343.87	2,451.30	1,811.78	1,917.93
Other Sewage Pumping Stations	....	....	....	72,111.20	66,046.81	77,288.72	108,167.90	112,254.18
Intercepting Sewer Pumping Stations	5.44	2,421.20	153.47	....	....	....	....	....
Water Works Shops—General Salaries and Expenses	24,490.65	28,628.09	13.00	....	....	....	....	....
Superintendence of Pumping Stations, Repair Shops and Cribs	23,237.05	17,632.10	14,019.80	16,923.79	16,491.30	15,731.94	15,176.65	23,283.79
Military Service	....	....	....	....	5,719.42	10,004.65	....	....
Municipal Power Plant	....	....	....	....	....	8,788.89	90,121.02	64,048.17
Marshall Boulevard Municipal Plant	....	....	....	....	....	323.86	1,201.00	1,201.00
Preliminary Studies for Extension of Water System	....	....	....	....	....	215.54	1,671.25	1,069.15
Taxes on City Property	....	....	....	....	....	....	962.36	2.97
Miscellaneous	....	....	1,200.00	1,200.00	....	....	....	2,500.00
Totals	$2,224,602.68	$1,998,577.82	$1,750,332.53	$1,842,046.07	$2,277,275.19	$2,630,037.49	$3,285,660.80	$3,211,625.59

TABLE No. XVIII

Comparative Statement of Expenditures for Repairs and Renewals of Water Works Property and Equipment for the Years 1912 to 1919 inclusive

CLASSIFICATION	1912	1913	1914	1915	1916	1917	1918	1919
Testing Division					$ 228.56			
Water Waste Surveys					121.24	$ 506.74		
Cribs	$ 13,409.78	$ 12,360.31	$ 14,734.61	$ 8,583.67	18,979.26	4,728.53	$ 6,866.10	$ 48,227.94
Tunnels	3,380.44	9,697.10	5,301.24	23,297.06	12,947.47	14,946.34	1,970.39	4,912.69
Pumping Stations	260,985.20	224,770.47	228,664.67	175,002.62	195,631.12	158,899.12	244,178.75	335,365.83
Mains, Hydrants and Valves	843,933.03	854,630.87	1,067,160.51	1,107,173.97	905,094.41	899,149.56	920,311.11	1,064,040.71
Tapping and Retapping	79,995.47	80,354.50	57,625.73	60,455.34	51,026.49	54,309.73	37,547.32	52,313.53
Service Pipes, Taps, Shut-off Boxes, Etc.	72,188.29	60,685.00						
Pipe and District Yards			989.96	502.73	1,543.69	3,249.98	200.92	
Meters	72,168.53	68,105.20	67,924.30	64,008.15	65,729.71	77,121.54	96,646.40	112,400.79
Intercepting Sewer Pumping Stations	119.46							
Fullerton Ave. Sewage Pumping Station	470.48	492.45	219.51	15.95	26.10		27.60	261.35
Other Sewage Pumping Stations				4,659.17	6,062.15	6,251.34	7,957.29	10,590.42
Maintenance of Intercepting Sewers	305.30	355.99		1,363.80	397.06	587.11		
Water Works Shop and Repair Division	16,707.81	13,652.01	52.00	490.15	53.39	112.59		
Dredging North Branch of Chicago River	367.13							
Electrolysis Surveys	6.80					20.45		
Water Works Property Rented to Private Parties			876.69	10.00				
Grower Property					12.40			
Special Assessments City Property						412.18	17,727.17	7,627.62
Municipal Power Plant							2,838.21	6,993.38
Totals	$1,364,037.72	$1,325,103.90	$1,443,549.22	$1,445,502.11	$1,252,753.05	$1,247,295.21	$1,336,271.26	$1,642,734.26

TABLE No. XIX

Comparative Statement of Expenditures for Additions, Extensions and Betterments of Water Works Property and Equipment for the Years 1912 to 1919 inclusive

CLASSIFICATION	1912	1913	1914	1915	1916	1917	1918	1919
Cribs		$ 4,493.70	$ 63.20	$ 14.41	$ 2.77			
Lake Tunnels	$ 36,533.07	165,188.04						$ 6,864.93
Land Tunnels	55,729.10	95,887.32	274,658.56	1,260,100.76	1,116,537.45	$1,077,748.35	$ 345,946.66	250,422.66
Pumping Stations	506,072.91	482,050.81	629,921.74	577,956.70	836,781.10	1,161,836.69	548,902.83	651,923.70
Mains, Hydrants and Valves	1,719,222.50	1,173,945.00	1,467,383.25	2,052,469.58	1,590,963.51	1,197,299.94	773,505.34	569,267.93
Service Pipes, Taps, Shut-off Boxes, Etc.	526.07	194.28	158.28	65.50			67.68	10.95
Pipe and District Yards	1,512.44	2,836.68	4,743.14	3,442.24	8,533.08	3,348.06		
Meters	53,258.89	42,103.01	56,937.67	136,897.82	58,518.91	107,826.81	144,881.53	162,689.68
Testing Laboratory					2,205.45	2,086.50		
General Repair Shops		8,903.59	4,038.52					
Fullerton Ave. Sewage Pumping Station	6,557.31	11,538.19	2,740.35					
Other Sewage Pumping Stations				9,303.05	10,470.79	2,596.24	526.05	12,447.45
Rogers Park Water System (Purchase Price)	52,897.25							
Intercepting Sewer System	2,000.00	2,270.00	65.00	1,709.66		4,272.80		
Marshall Boulevard Municipal Plant	12,667.03	30,582.81	275,013.45	692,416.49	604,696.13	544,941.52	359,514.83	60,295.40
Fullerton Ave. Intake Crib	115.00	2,760.00						
Natatoriums	9,750.00		4,702.78	72,529.21	32,406.37	14,564.30		
Purchase of Real Estate		188,107.48	6,682.94		25,000.00	12,679.92		
Gas Power Boat "Illinois"				4,500.00				
Meter Repair Shops and Testing Plant						7,200.00		
Totals	$2,456,841.57	$2,210,860.91	$2,727,108.88	$4,811,405.42	$4,286,115.56	$4,136,396.13	$2,173,344.92	$1,718,922.70

TABLE No. XX—SEWAGE PUMPING STATIONS

Detailed Statement of Expenditures for Operation During the Year 1919

PUMPING STATIONS	Salaries	Fuel and Power	Oil	Waste	Grease	Testing	Tools	Miscellaneous	Total	Per Cent
95th Street	$22,421.52	$ 5,674.15	$207.94	$153.37	$ 4.85	$ 99.00	$ 28.83	$ 461.88	$29,051.54	25.9
Stony Island Avenue	22,682.72	6,436.62	144.25	90.00	34.87	108.00	33.34	700.95	30,230.75	26.9
Kensington	12,200.20	5,066.98	231.23	85.00	1.60	27.00	10.29	285.26	17,907.56	15.9
Hegewisch	6,574.92	1,464.76	146.15	41.13	1.89	2.75	16.85	316.65	8,565.10	7.7
Pullman	8,213.09	4,535.01	22.95				1.05	543.04	13,315.14	11.8
Rogers Park	9,410.07	3,332.88	74.18	31.43		2.75	3.05	329.73	13,184.09	11.8
Totals	$81.502.52	$26,510.40	$826.70	$400.93	$ 43.21	$239.50	$ 93.41	$2,637.51	$112,254.18	100.

Detailed Statement of Expenditures for Repairs and Renewals During the Year 1919

PUMPING STATIONS	Buildings and Grounds	Engines and Pumps	Boilers and Furnaces	Piping and Steamfitting	Coal and Ash Handling Plant	Electric Lighting System	Miscellaneous	Total	Per Cent
95th Street	$ 93.08	$ 242.28	$ 944.78	$ 269.55		$23.93		$ 1,573.62	14.8
Stony Island Avenue	1,308.56	1,409.50	243.31	495.24	$144.51	71.00	$43.11	3,715.23	35.1
Kensington	24.47	557.62	614.68	93.51			.98	1,291.26	12.2
Hegewisch	156.94	2,522.54		16.70			4.36	2,700.54	25.5
Pullman	236.04		2.20	9.12			1.60	248.96	2.4
Rogers Park	289.15	767.68					3.98	1,060.81	10.
Totals	$2,108.24	$5,499.62	$1,804.97	$884.12	$144.51	$94.93	$54.03	$10,590.42	100.

Detailed Statement of Expenditures for Additions, Extensions and Betterments During the Year 1919

PUMPING STATIONS	Buildings and Grounds	Engines and Pumps	Boilers and Furnaces	Piping and Steamfitting	Coal and Ash Handling Plant	Electric Lighting System	Miscellaneous	Total	Per Cent
95th Street	$7,448.70							$ 7,448.70	60.
Temporary Pumping Station, 108th St. & Ave. F							$4,998.75	4,998.75	40.
Totals	$7,448.70						$4,998.75	$12,447.45	100.

TABLE No. XXI—WATER PUMPING STATIONS

Detailed Statement of Expenditures for Operation During the Year 1919

PUMPING STATIONS	Salaries	Fuel and Power	Oil	Waste	Grease	Chlorine	Tools	Testing	Miscel-laneous	Total	Per Cent
Fourteenth Street	$ 71,322.06	$ 98,202.00	$ 1,787.09	$ 465.12	$ 52.69	$ 5,266.47	$ 642.52	$ 453.56	$11,060.78	$ 189,252.29	11.8
Sixty-eighth Street	71,074.18	140,409.74	2,429.10	832.98	89.79	8,089.43	648.47	893.54	10,370.84	234,837.52	14.6
Twenty-second Street	58,384.80	114,084.79	801.87	612.39	165.33	5,038.92	442.72	391.68	5,586.77	185,509.27	11.6
Chicago Avenue	78,917.89	72,709.95	1,619.53	1,383.30	269.67	5,538.92	742.92	384.12	9,052.26	170,618.56	10.6
Springfield Avenue	65,595.43	65,226.46	850.40	828.58	102.56	4,086.61	244.67	687.57	10,418.27	148,035.55	9.2
Central Park Avenue	71,311.37	90,905.99	1,730.61	1,187.07	196.86	4,721.52	404.92	603.04	10,712.72	181,774.10	11.3
Harrison Street	38,442.45	44,490.58	389.41	276.55	32.79	2,281.66	250.20	474.95	3,940.03	90,578.62	5.6
Lake View	64,608.73	57,704.65	2,300.04	899.45	35.65	4,130.26	278.87	359.62	7,664.38	137,981.65	8.5
Roseland	61,848.90	58,422.65	5,073.58	585.10	59.68	4,682.90	192.31	316.13	4,606.56	135,787.81	8.5
Mayfair	66,784.53	48,625.73	3,197.81	1,309.86	79.67	3,676.03	1,378.72	628.16	6,770.50	132,451.01	8.3
Jefferson Park (Booster)	....	5.12	....	....	....	....	....	....	3.99	9.11	....
Totals	$648,290.29	$790,787.66	$20,179.44	$8,380.40	$1,084.69	$47,512.72	$5,226.32	$5,192.37	$80,181.60	$1,606,835.49	100.

TABLE No. XXII—WATER PUMPING STATIONS

Detailed Statement of Expenditures for Repairs and Renewals During the Year 1919

PUMPING STATIONS	Buildings and Grounds	Engines and Pumps	Boilers and Furnaces	Piping and Steamfitting	Coal and Ash Handling Plant	Electric Lighting System	Chlorin-ating Plant	Miscel-laneous	Total	Per Cent
Fourteenth Street	$ 6,754.09	$ 10,527.74	$ 6,151.59	$ 7,261.93	$ 3,332.44	$ 65.16	$ 2,668.43	$ 617.95	$ 37,379.33	11.1
Sixty-eighth Street	9,595.56	22,565.06	49,313.43	8,272.12	3,839.74	2,645.04	6,327.45	1,191.99	98,750.39	29.5
Twenty-second Street	9,519.99	10,302.57	2,340.42	1,101.58	39.48	773.43	775.89	201.08	25,054.44	7.5
Chicago Avenue	7,696.18	16,896.66	7,727.14	2,673.39	3,807.99	277.89	502.16	1,518.97	41,190.38	12.3
Springfield Avenue	8,203.18	6,710.36	3,559.23	2,290.99	1,293.27	241.72	947.58	549.60	18,795.93	5.6
Central Park Avenue	6,242.03	15,893.86	8,215.41	1,162.42	543.84	202.61	421.02	440.52	33,121.71	9.9
Harrison Street	1,680.70	15,438.11	2,178.35	1,725.24	237.04	7.28	262.53	152.94	21,682.19	6.5
Lake View	2,879.27	7,301.08	5,379.78	4,094.81	3,007.32	998.66	357.55	408.27	24,426.74	7.3
Roseland	2,739.63	6,094.34	5,531.16	1,516.78	1,791.43	443.03	1,012.60	684.73	19,813.70	5.9
Mayfair	355.86	5,198.48	3,092.96	2,687.07	1,433.41	....	100.95	239.07	13,107.80	3.6
Rogers Park	2,043.22	....	....	....	....	....	....	....	2,043.22	.8
Totals	$52,709.71	$117,018.26	$93,489.47	$27,786.33	$19,325.96	$5,694.82	$13,376.16	$6,005.12	$335,365.83	100.

TABLE No. XXIII—WATER PUMPING STATIONS

Detailed Statement of Expenditures for Additions, Extensions and Betterments During the Year 1919

PUMPING STATIONS	Buildings and Grounds	Engines and Pumps	Boilers and Furnaces	Piping and Steamfitting	Coal and Ash Handling Plant	Electric Lighting System	Chlorinating Plant	Miscellaneous	Total	Per Cent
Fourteenth Street	....	....	....	....	....	....	$ 955.00	....	$ 955.00	.2
Sixty-eighth Street	$ 2,008.62	$ 60,414.97	$15,473.16	$10,610.04	....	$ 147.97	966.07	$ 20.62	89,641.45	13.7
Twenty-second Street	1,470.76	43,263.99	....	156.87	....	2,875.39	27.67	322.82	48,117.50	7.4
Chicago Avenue	71,639.16	75,215.99	....	77.81	$ 460.00	342.73	....	713.72	148,449.41	22.8
Springfield Avenue	34,924.41	1,964.65	25,297.78	8,430.41	2,896.19	2,724.15	....	7,094.12	83,331.71	12.8
Central Park Avenue	4,001.89	.35	561.53	6,807.10	16,909.41	....	....	13,870.73	42,151.01	6.5
Roseland	2,200.00	....	....	....	....	....	....	....	2,200.00	.3
Mayfair	49,086.05	95,895.33	28,666.88	33,110.21	8,360.22	3,914.64	2,113.80	13,560.04	234,707.17	36.0
William Hale Thompson	842.59	552.86	624.73	....	316.64	....	....	33.63	2,370.45	.3
Totals	$166,173.48	$277,308.14	$70,624.08	$59,192.44	$28,942.46	$10,004.88	$ 4,062.54	$35,615.68	$651,923.70	100.

TABLE No. XXIV—WATER PUMPING STATIONS

Comparative Statement of Expenditures for Operation during the Years 1910 to 1919 inclusive

PUMPING STATIONS	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919
Chicago Avenue	$102,787.12	$ 99,400.11	$108,716.67	$ 96,023.82	$102,072.32	$102,596.96	$107,164.29	$ 128,341.05	$ 234,739.62	$ 170,618.56
Fourteenth Street	100,264.94	99,028.56	106,957.73	100,822.16	108,945.20	113,136.17	104,732.24	146,320.29	212,889.73	189,252.29
Harrison Street	50,806.98	47,106.51	53,638.93	48,008.36	54.801.26	59,553.20	56,382.44	67,819.48	102,797.23	90,578.62
Lake View	90,525.67	86,481.85	94,444.42	95,621.27	123,534.16	113,613.64	85,205.31	122,409.08	185,567.40	137,981.65
Twenty-second Street	108,552.56	89,980.75	141,068.24	136,581.64	138,720.55	140,255.10	136,459.14	168,015.26	186,567.49	185,509.27
Sixty-eighth Street	140,057.98	139,365.70	129,867.92	112,315.52	120,006.82	136,837.78	126,463.09	193,642.33	245,410.43	234,837.52
Central Park Avenue	105,217.99	103,781.38	105,154.79	105,156.47	123,845.96	124,336.75	117,692.90	172,093.58	226,092.38	181,774.10
Springfield Avenue	102,505.53	98,573.51	112,136.06	106,387.00	124,364.83	118,404.06	115,926.59	152,839.17	183,014.66	148,035.55
Norwood Park	6.314.43	7,318.11	7,286.24	1,079.00	3,501.69	1,015.47	....	....	....	....
Washington Heights	14,737.58	12,674.51	12,710.72	12,365.78	10,149.59	141.95	....	....	....	....
Rogers Park	15,083.82	15,299.26	16,224.48	16,040.56	15,606.54	12,813.52	7,984.43	12,970.76	....	....
Roseland	....	6,100.82	48,999.10	52,773.21	54,435.79	62,116.10	74,131.36	100,690.94	140,385.27	135,787.81
Edison Park	....	592.22	851.76	348.87	22.53	.16	....	....	....	....
Morgan Park	....	2,622.75	2,368.48	....	....	....	5,815.23	....	....	....
Jefferson Park	....	....	934.94	19,308.91	11,248.29	10,650.67	10,199.93	12,593.81	11,228.94	9.11
Mayfair	....	....	....	....	....	....	....	1,237.56	83,910.00	132,451.01
Totals	$836,854.69	$808,326.04	$941,360.48	$902,832.57	$991,255.53	$995,471.53	$948,156.95	$1,278,973.31	1,812,603.15	$1,606,835.49
Percentage of increase of expenditures over preceding year	11.	*34.	16.5	*4.1	9.8	.4	*4.7	25.8	29.4	*12.8
Millions of gals. of water pumped	188,747	185,176	201,785	210,919	223,863	222,412	327,999	248,893	243,745	260,774
Expenditures for operation of pumping stations per 1000 gals.	$.00443	$.00436	$.00466	$.00428	$.00441	$.00447	$.00398	$.00513	$.00743	$.00616

*Decrease.

TABLE No. XXV—WATER PUMPING STATIONS

Comparative Statement of Expenditures for Repairs and Renewals during the Years 1910 to 1919 inclusive

PUMPING STATIONS	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919
Chicago Avenue................	$ 18,032.43	$ 42,534.00	$ 36,047.79	$ 43,325.62	$ 25,559.44	$ 19,723.96	$ 22,989.41	$ 27,263.70	$ 22,792.62	$ 41,190.38
Fourteenth Street.............	12,855.47	26,531.38	38,919.94	28,832.08	33,829.88	26,007.36	21,822.75	28,543.74	29,647.72	37,379.33
Harrison Street...............	6,515.87	13,757.83	8,397.99	9,684.04	15,394.29	9,032.74	13,043.95	12,986.04	18,074.84	21,682.19
Lake View.....................	8.115.87	12,909.92	8,598.21	10,311.98	14,421.14	15,687.51	19,589.31	15,734.95	14,864.67	24,426.74
Twenty-second Street..........	9,945.59	19,498.66	13,999.07	18,545.84	21,662.00	15,778.15	34,151.64	13,191.17	14,871.11	25,054.44
Sixty-eighth Street...........	21,210.49	30,178.12	49,578.33	24,936.34	28,042.94	29,239.16	27,528.93	34,940.80	70,244.16	98,750.39
Central Park Avenue...........	14,886.80	21.227.94	38,769.78	35,624.09	42,945.05	25,055.78	23,510.38	21,110.86	28,705.37	33,121.71
Springfield Avenue............	14,287.33	26,299.37	53,785.59	40.610,67	33,516.87	21,595.97	18,071.62	14,900.41	20,225.03	18,795.93
Norwood Park..................	1,390.58	3,815.89	3,019.19	179.12	178.87	29.48	8.23	9.85	....	....
Washington Heights............	2,424.79	1,868.98	686.80	2,063.95	282.35	24.50	....	....	....	....
Rogers Park...................	1,989.39	2,482.99	1,532.82	5,581.42	1,837.56	1,910.25	611.84	464.38	9,523.76	2,043.22
Roseland......................	....	342.75	7,560.60	9,239,72	9,644.27	10,475.41	12,950.73	12,669.12	13,592.78	19,813.70
Edison Park...................	....	220.29	21.77	117.85	40.50	75.00	737.36	6.38	....	....
Morgan Park...................	....	752.97	67.32	....	162.12	....	....	....	....	....
Englewood (proposed pump).....	50.05	10.11	....	6.61	....	6.10	12.89	....	....	....
Jefferson Park................	....	....	....	711.14	933.52	106.52	327.53	749.33	168.21	....
Mayfair.......................	....	....	....	....	214.37	254.78	274.55	328.39	1,468.48	13,107.80
Totals....................	$111,704.66	$202,431.20	$260,985.20	$224,770.47	$228,664.67	$175,002.62	$195,631.12	$185,899.12	$244,178.75	$335,365.83
Percentage of increase of expenditures over preceding year....	*9.6	81.2	28.9	*13.8	1.7	*23.5	11.8	*5.2	23.8	27.1
Millions of gals. of water pumped	188,747	185,176	201,785	210,919	223,863	222,412	237,399	248,893	243,745	260,774
Expenditures for repairs and renewals of pumping stations per 1,000 gallons..............	$.000591	$.001093	$.001293	$.001065	$.001021	$.000786	$.000824	$.000746	$.001001	$.001286

*Decrease.

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- Cribs:
  - Two-Mile........................
  - Four-Mile......................
  - Lake View......................
  - Hyde Park......................
  - Carter H. Harrison..............
  - Edward F. Dunne..............
- Tunnels:
  - Lake Tunnels.................
  - Land Tunnels.................
  - Water Pipe Tunnels............
- Cribs and Tunnels—Unsegregated....
- Pumping Stations:
  - Fourteenth Street..............
  - Sixty-eighth Street.............
  - Twenty-second Street..........
  - Chicago Avenue...............
  - Springfield Avenue.............
  - Central Park Avenue...........
  - Harrison Street.................
  - Lake View......................
  - Norwood Park.................
  - Washington Heights.............
  - Englewood......................
  - Roseland.......................
  - Rogers Park....................
  - Jefferson Park..................
  - Mayfair.........................
  - William Hale Thompson.........
  - Stock Yards (proposed).........
- Water Pipe Extension:
  - Mains, Hydrants and Valves.....
  - Service Pipes...................
  - Meters, including cost of installati
  - Pipe and District Yards.........
- General Repair Shops:
  - Water Works Shops, Ashland Ave
  - General Construction and Repair
  - Meter Repair Shop and Testing
- Marshall Boulevard Municipal Plant..
- Testing Laboratory..................
- Meter Repair Shop and Testing Plant,
- Grower Property—Southeast corner M
- Real Estate (sites including Rookery lo
- Office Equipment in City Hall........
- Public Baths and Natatoriums........
- Gas Power Boat "Illinois"...........
- Sewage Pumping Stations:
  - Stoney Island Avenue...........
  - Pullman........................
  - Rogers Park....................
  - Ninety-fifth Street..............
- Intercepting Sewer System...........

Totals.........

TABLE No. XXVI—WATER PUMPING STATIONS

Comparative Statement of Total Expenditures for Operation and Repairs and Renewals during the Years 1910 to 1919 inclusive

PUMPING STATIONS	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919
Chicago Avenue........	$120,819.64	$ 141,934.11	$ 144,764.46	$ 139,349.44	$ 127,631.76	$ 122,320.92	$ 130,153.70	$ 155,604.75	$ 257,532.24	$ 211,808.94
Fourteenth Street........	113,120.41	125,559.94	145,877.67	129,654.24	142,775.08	139,143.53	126,554.99	174,864.03	242,537.45	226,631.62
Harrison Street..........	57,322.85	60,864.34	62,036.92	57,692.40	70,195.55	68,585.94	69,426.39	80,805.52	120,872.07	112,260.81
Lake View..............	98,641.54	99,391.77	103,042.63	105,933.25	137,955.30	129,301.15	104,794.62	138,144.03	200,432.07	162,408.39
Twenty-second Street	118,498.15	109,479.41	155,067.31	150,127.48	160,382.55	156,033.25	170,610.78	181,206.43	201,438.60	210,563.71
Sixty-eighth Street	161,268.47	169,543.82	179,446.25	137,251.86	148,049.76	166,076.94	153,992.02	228,583.13	315,654.59	333,587.91
Central Park Avenue	120,104.79	125,009.32	143,924.57	140,780.56	166,791.01	149,392.48	141,203.28	196,204.44	254,797.75	214,895.81
Springfield Avenue	116,792.86	124,872.88	165,921.65	146,997.67	157,881.70	140,000.03	133,998.21	167,789.58	203,239.69	166,831.48
Norwood Park...........	7,705.01	11,134.00	10,305.43	1,258.12	3,680.06	1,044.95	8.23	9.85	....	....
Washington Heights.....	17,162.37	14,543.49	13,397.52	14,429.73	10,431.94	166.45	....	....	....	....
Rogers Park............	17,073.21	17,782.25	17,757.30	21,621.98	17,444.10	14,723.77	8,596.27	13,435.14	9,523.76	2,043.22
Roseland..............	....	6,443.57	56,559.70	62,012.93	64,080.06	72,591.51	87,082.09	113,360.06	153,978.05	155,601.51
Edison Park............	....	812.51	873.53	466,72	63.03	75.16	737.36	6.38	....	....
Morgan Park...........	....	3,375.72	2,485.80	....	162.12	....	5,815.23	....	....	....
Englewood (proposed pump)............	50.05	10.11	....	6.61	....	6.10	12.89	....	....	....
Jefferson Park..........	....	....	934.94	20,020.05	12,181.81	10,757.19	10,527.46	13,343.14	11,397.15	9.11
Mayfair...............	....	....	....	....	214.37	254.78	274.55	1,565.95	85,378.48	145,558.81
Totals.............	$948,559.35	$1,010,757.24	$1,202,345.68	$1,127,603.04	$1,219,920.20	$1,170,474.15	$1,143,788.07	$1,464,872.43	$2,056,781.90	$1,942,201.32
Percentage of increase of expenditures over preceding year..........	8.2	6.5	18.9	*6.2	8.2	*4.0	*2.3	21.9	28.7	*5.9
Millions of gals. of water pumped............	188,747	185,176	201,785	210,919	223,863	222,412	237,399	248,893	243,745	260,774
Percentage of increase of pumpage over preceding year................	7.3	*1.9	8.9	4.5	6.1	*.6	6.7	4.6	*2.1	6.5
Expenditure for operation and repairs and renewals of pumping stations per 1,000 gallons..........	$.00502	$.00546	$.00595	$.00534	$.00544	$.00526	$.00481	$.00588	$.00843	$.00744

*Decrease.

TABLE No. XXIX

Trial Balance Water Works General Ledger December 31, 1919

Account	Dr.	Cr.
Water fund (departmental)	$ 8,387,250.65	$ 7,143,958.54
Assessed rates receipts		3,428,962.93
Meter rates receipts		4,303,025.01
Miscellaneous water sale receipts		17,763.16
Miscellaneous receipts		30,512.48
Refunds	34,996.41	
Warrants for collection	334,312.16	226,623.46
Warrants for collection (delinquent)	122,046.81	
Judgment expense	14,350.81	
Judgments	14,733.62	19,293.86
Costs on judgments	70.50	
Water works, income	65,236.49	157,194,130.80
Cashier's petty cash fund	4,200.00	
Water pipe extension, petty cash fund	100.00	
Department of supplies, stock account	15,000.00	
General assessment	6,584,769.05	4,547,235.74
General assessment suspense	11,669.86	7,987.45
Water works general assessment	4,546,894.56	6,588,110.28
Water loan refunding bonds (4 per cent)	70,000.00	1,130,400.00
Water certificates	500,000.00	500,000.00
General corporate bonds	78,400.00	694,400.00
Water pipe extension certificates	27,857.35	518,207.21
Interest on bonds and certificates	11,534,222.69	
Special assessments (mains)	17,484.34	17,484.34
Special assessments (service pipes)	10.95	10.95
Water works property and equipment	78,795,873.98	
Operation	3,226,590.34	25,261.46
Repairs and renewals	1,642,734.26	
Water works expense	69,715,326.84	37,129.70
Special deposit fund	143,006.47	71,501.47
Sundry deposits	71,501.47	143,006.47
Free taxes	1,784,625.05	
Free water service		1,804,681.55
Free public service	1,804,681.55	1,784,625.05
Depreciation	16,853,968.76	
Appreciation		5,828,666.12
Water works depreciation	883,141.58	11,908,444.22
Investment in special funds	686,173.01	
Deposit with Commonwealth Edison Co.	192.69	
Bureau of Parks, capital account		2,000.00
Bureau of Parks, cash available	3,355.76	
Bureau of Parks, revenue and expense		1,355.76
Municipal shops, capital account		101,199.01
Municipal shops, cash available	557,052.91	688,457.90
Municipal shops, warrants for collection	626,059.57	557,278.54
Municipal shops, revenue and expense	728,463.77	564,640.80
Water pipe extension, capital account		20,000.00
Water pipe extension, cash available	326,266.78	403,197.71
Water pipe extension, warrant for collection	455,046.86	331,241.27
Water pipe extension, revenue and expense	394,786.51	421,611.17
City engineer's designing division, capital account		32,974.00
City engineer's designing division, cash available	71,254.97	44,851.15
City engineer's designing division, warrants for collection	54,316.75	44,740.82
City engineer's designing division, revenue and expense	46,108.17	49,113.92
Water works suspense stock, capital account		300,000.00
Water works suspense stock, cash available	710,328.81	820,848.39
Water works suspense stock, warrants for collection	938,322.13	710,846.61
Water works suspense stock, revenue and expense	983,360.82	800,316.76
Construction division, capital account		200,000.00
Construction division, cash available	2,556,044.43	2,690,967.37
Construction division, warrants for collection	3,036,520.39	2,575,116.80
Construction division, revenue and expense	2,590,452.48	2,716,933.13
Testing division, capital account		15,000.00
Testing division, cash available	43,099.70	46,485.27
Testing division, warrants for collection	47,074.53	43,108.50
Testing division, revenue and expense	58,929.77	44,510.23
Totals	$222,198,217.36	$222,198,217.36

TABLE No. XXX

Trial Balance Water Works General Ledger January 1, 1920

Account	Dr.	Cr.
Water fund (departmental)	$ 1,243,292.11	
Warrants for collection	107,688.70	
Warrants for collection (delinquent)	122,046.81	
Judgments		$ 4,560.24
Water works, income		164,874,161.48
Cashier's petty cash fund	4,200.00	
Water pipe extension, petty cash fund	100.00	
Department of supplies, stock account	15,000.00	
General assessment	2,037,533.31	
General assessment suspense	3,682.41	
Water works, general assessment		2,041,215.72
Water loan refunding bonds, 4 per cent		1,060,400.00
General corporate bonds		616,000.00
Water pipe extension certificates		490,349.86
Interest on bonds and certificates	11,534,222.69	
Water works property and equipment	78,795,873.98	
Water works expense	74,536,681.59	
Special deposit fund	71,505.00	
Sundry deposits		71,505.00
Depreciation	16,853,968.76	
Appreciation		5,828,666.12
Water works depreciation		11,025,302.64
Investments in special funds	686,173.01	
Deposit with Commonwealth Edison Company	192.69	
Bureau of Parks, capital account		2,000.00
Bureau of Parks, cash available	3,355.76	
Bureau of Parks, revenue and expense		1,355.76
Municipal shops, capital account		101,199.01
Municipal shops, cash available		131,404.99
Municipal shops, warrants for collection	68,781.03	
Municipal shops, revenue and expense	163,822.97	
Water pipe extension, capital account		20,000.00
Water pipe extension, cash available		76,930.93
Water pipe extension, warrants for collection	123,805.59	
Water pipe extension, revenue and expense		26,874.66
City engineer's designing division, capital account		32,974.00
City engineer's designing division, cash available	26,403.82	
City engineer's designing division, warrants for collection	9,575.93	
City engineer's designing division, revenue and expense		3,005.75
Water works suspense stock, capital account		300,000.00
Water works suspense stock, cash available		110,519.58
Water works suspense stock, warrants for collection	227,475.52	
Water works suspense stock, revenue and expense	183,044.06	
Construction division, capital account		200,000.00
Construction division, cash available		134,922.94
Construction division, warrants for collection	461,403.59	
Construction division, revenue and expense		126,480.65
Testing division, capital account		15,000.00
Testing division, cash available		3,385.57
Testing division, warrants for collection	3,966.03	
Testing division, revenue and expense	14,419.54	
Totals	$ 187,298,214.90	$187,298,214.90

TABLE No. XXXI

Statement of Estimated Cost of and Revenue from Supplying Water to Consumers during the Year 1919

COST		
Expenditures for operation (see Table No. XIV)	$ 3,201,399.38	
Expenditures for interest on certificates and judgments (see Table No. XIV)	10,226.21	
Expenditures for repairs (see Table No. XV)	1,642,734.26	
Expenditures for refunds	34,996.41	
Total or ordinary expenditures during the year 1919		$4,889,356.26
Sinking fund for bonds issued for benefit of water works, provided by annual corporate tax levy for 1919	148,400.00	
Interest on bonds issued for benefit of water works paid from corporate fund	75,472.00	
Less net appreciation of water works property and equipment during the year 1919 over amount expended for repairs	883,141.58	
Interest on invested capital less net depreciation and bonds outstanding assumed at rate of 3 per cent	1,982,825.14	1,323,555.56
Total estimated cost of supplying water consumed during the year 1919, including allowance for such sinking fund, depreciation and interest		6,212,911.82
Total number of gallons of water pumped during the year 1919	26,077,462,000	
Cost per 1,000 gallons of water pumped, based on total ordinary expenditures $	.0187	
Assuming 50 per cent of total pumpage for free water service,*leakage and wastage, the cost rate to paying consumers per 1,000 gallons actually delivered to paying consumers, based on total ordinary expenditures would be twice the cost per 1,000 gallons of water pumped based on total ordinary expenditures and would amount to	.0374	
Estimated cost per 1,000 gallons of water pumped, including allowance for sinking fund, depreciation and interest on net invested capital assumed at rate of 3 per cent	.0238	
Assuming 50 per cent of total pumpage for free water service,*leakage and wastage, the estimated cost rate to paying consumers per 1,000 gallons actually delivered to paying consumers, including allowance for sinking fund, depreciation and interest on net invested capital at assumed rate of 3 per cent, would be twice the estimated cost per 1,000 gallons of water pumped, including allowance for sinking fund, depreciation and interest on net invested capital at rate of 3 per cent and would amount to	.0476	
REVENUE		
Revenue from assessed rates (see Table No. X)	3,428,962.93	
Revenue from meter rates (see Table No. X)	4,303,025.01	
Revenue—Miscellaneous (see Table No. X)	275,863.80	
Total ordinary revenue during the year 1919		8,007,851.74
Revenue per 1,000 gallons of water pumped		.03071
Assuming 50 per cent of total pumpage for free water service, *leakage and wastage, the revenue from paying consumers per 1,000 gallons actually delivered to paying consumers would be twice the revenue from 1,000 gallons pumped and would amount to		.06142

*Note—See Table No. XI for estimated total amount of free water service during the year 1919.

TABLE No. XXXII

Certificates and Bonds Issued for Benefit of Water Works Outstanding January 1, 1920

Water loan refunding bonds, due serially, bearing 4 per cent interest		$1,060,400.00
General corporate bonds, due serially, bearing 4½ per cent interest	$ 440,000.00	
General corporate bonds, due serially, bearing 4 per cent interest	176,000.00	
		616,000.00
		$1,676,400.00

Note: In addition to the above water pipe extension, certificates amounting to $490,349.86 were outstanding December 31, 1919.

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